VOL. XXXI. No. 10 OCTOBER 1946

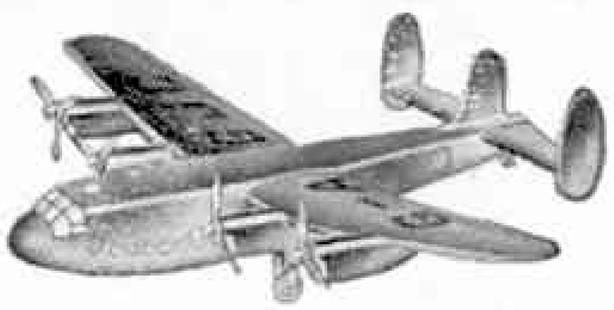
MECCANO MAGAZINE

ARCTIC PEACE

6D.

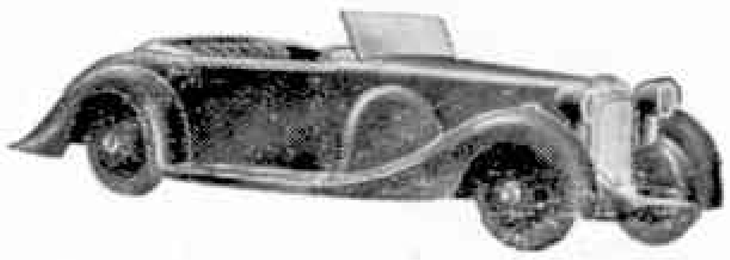
NEW DINKY TOYS

Now available!



Avro "York" Air Liner - No. 70a

Jeep - No. 153a



Lagonda Sports Coupé - No. 38c

AVRO "YORK" AIR LINER, No. 70a. A striking model of one of the latest British transport aircraft. "Yorks" are in service with the British Overseas Airways Corporation.

Price **3/9** each (including Tax)

JEEP, No. 153a. A wonderfully realistic miniature of the most famous car of the war. On all fronts, in all countries, the Jeep was ready to go anywhere and do anything.

Price **2/6** each (including Tax)

LAGONDA SPORTS COUPÉ, No. 38c. This is a fine model of one of the outstanding cars that will soon be familiar on our roads. You will be proud to own this model.

Price **2/9** each (including Tax

Obtainable ONLY from Meccano Dealers

MADE IN ENGLAND BY MECCANO LIMITED

★ *Coming soon . . . .*

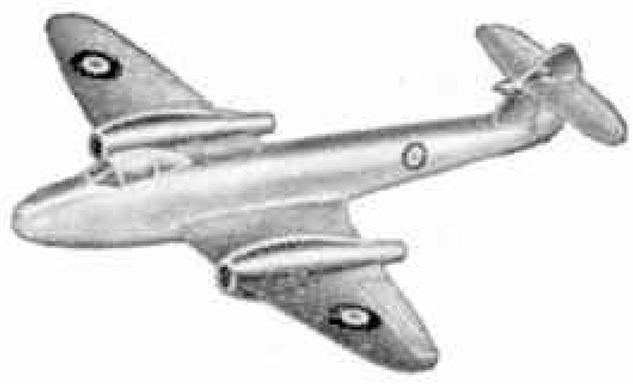
Jaguar Sports Car - No. 38f

JAGUAR SPORTS CAR, No. 38f. Here is a model that will make a special appeal to all sports car enthusiasts. Note the windscreen.

Price **2/9** each (including Tax)

GLOSTER "METEOR" JET FIGHTER, No. 70e. This is the first jet aircraft to be included in the Dinky Toys range. The "Meteor" holds the World Absolute Speed Record.

Price **1/3** each (including Tax)



Gloster "Meteor" Jet Fighter No. 70e

VITALITY BULBS

IMPROVED SUPPLIES NOW AVAILABLE

ADVISE IF YOUR RETAILER CANNOT SUPPLY BECAUSE SLIGHTLY BETTER STOCKS SHOULD NOW BE IN THE SHOPS

VITALITY BULBS LTD. NEVILLE PLACE LONDON. N.22.

THE "TRIDENT" KIT

Waterline 1" = 50'

of the Aircraft Carrier

H.M.S. "ILLUSTRIOUS"

Contains Shaped Hull, Outlined Decks, Superstructure, Fittings and Aircraft, Wire, Paint, Glue. Full instructions. Clear drawings. Price **7/6** or **7/11** post free. Also full range of Battleships, Cruisers, Destroyers

Latest Additions:

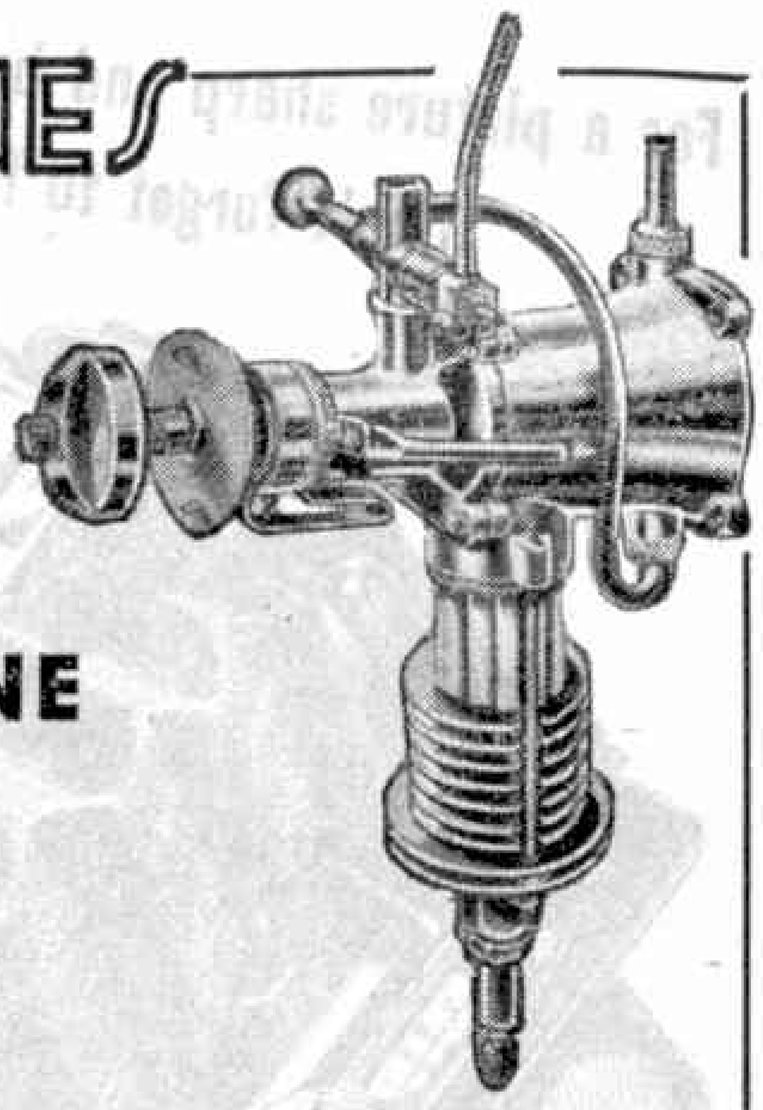
ELIZABETHAN GALLEON "GLORIANA." Full Hull—A SUPER KIT. Scale 1/10" = 1'. **21/-** post 6d. extra

R.M.S. "QUEEN ELIZABETH." Waterline 1" = 50'. Full colours. Reduced Cunard White Star Drawings.

Price **7/6** or **7/11** post free.

I. R. AMIS LIMITED (Model Makers to the Admiralty)
536, KINGSTON ROAD, RAYNES PARK, S.W.20
or your Dealer.

FROG — ENGINES



"175" — 75/-

1·75 MODEL AERO ENGINE

AN APOLOGY:

We intended to give bulk deliveries of the "175" and "45" a while back but unavoidable delays in the supply of materials and machine tools held us up. Anyway, YOU are benefiting by our big-scale planning. The price of the engine has just been reduced from 94/6 to 75/-; and the whole outfit at 112/6 is less than the price of the average engine alone. Fair enough?

"45" — THE FINEST POWER MODEL KIT IN THE WORLD

37/6

MADE IN ENGLAND BY

INTERNATIONAL MODEL AIRCRAFT LTD · MERTON · LONDON · SW · 19

For a picture sharp and bright
Don't forget to focus right

ILFORD SELO FILMS

Build this real live Steam Loco Now!

In 30 hours it is possible to build from a set of finished parts, the famous Bassett-Lowke Gauge 'O' Steam Mogul. Price £10-7-0 plus £2-5-0 Purchase Tax, including a fully illustrated book on how to build it.

WRITE FOR

"Laying Model Permanent Way" price 3d.
"How to Build a Traction Engine," price 6d.
Abridged Catalogue Gauge "O" Model Railways (G./17), price 6d.

BASSETT-LOWKE LTD.
NORTHAMPTON
LONDON: 112, High Holborn, W.C.1
MANCHESTER: 28, Corporation St.

DUNLOP

still

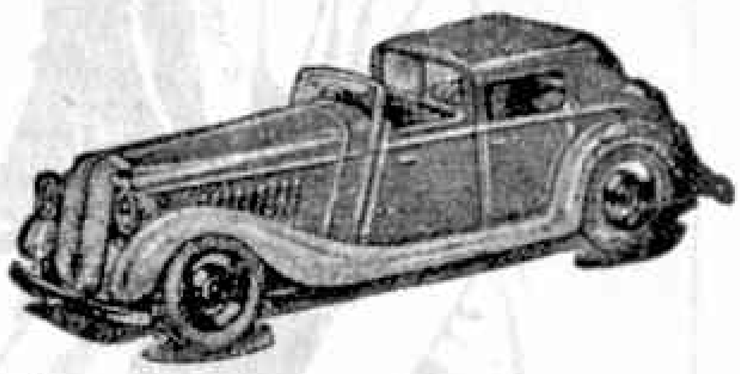
the standard by which all tyres are judged

6H/306

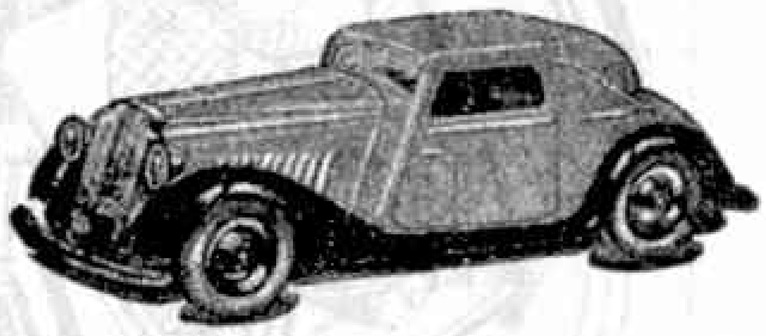
Tri-ang Toys

REGD TRADE MARK

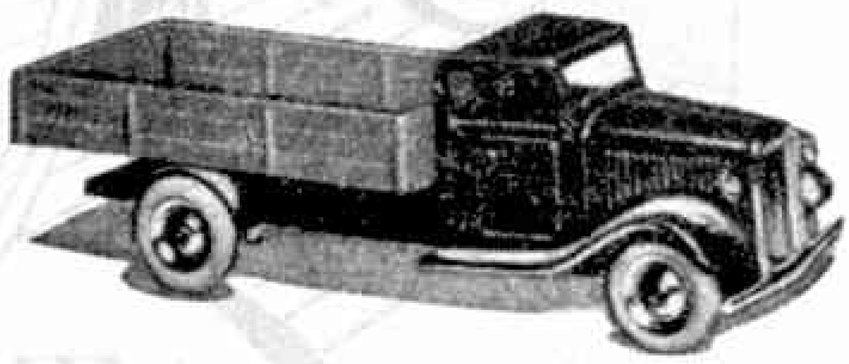
Johnny was thrilled when he received his first Minic Motor. Dad saw he was so delighted, that as a surprise, he bought him another. He certainly gets a lot of pleasure out of these grand toys. Now he is saving his pocket money, so that he can buy the whole fleet when they become available in his local toy shop. Every one of these Minic All-to-Scale Clockwork Motors is made to the usual high standard of Tri-ang Toys. Each is beautifully finished, and fitted with a powerful long-running clockwork motor. More types are being produced so that soon nearly every type of vehicle on the road will be represented in this popular range of toys.



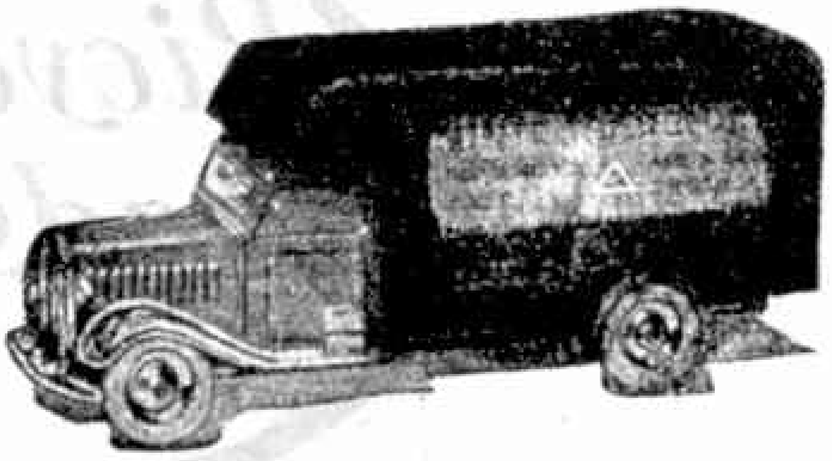
MINIC Vauxhall Town Coupé
Length 5"



MINIC Vauxhall Cabriolet.
Length 5".



MINIC Delivery Lorry. Length 5½".



MINIC Luton Transport Van.
Length 5½".

L. BROS. LTD. LONDON BROS ENGLAND

AGENTS IN ALL PARTS OF THE WORLD

LINES BROS. LTD., MERTON, LONDON S.W.19

B.S.A. Cycles Ltd., Birmingham, 11.

Next Month: "A FAMOUS PLEASURE FLEET"

MECCANO MAGAZINE

Editorial Office:
Binns Road
Liverpool 13
England

Vol. XXXI
No. 10
October 1946

With the Editor

Engine Names and Numbers

I am interested to note from my correspondence that the hobby of "collecting" numbers and names of railway locomotives shows signs of something like a boom. To "outsiders" this seems a strange hobby; recently I heard a man describe those who indulge in it as "clean daft"! Nevertheless the hobby can be made one of real interest and value. There is of course little fun in preparing a long list of nothing but numbers and names of engines. These details are already available in various excellent publications, many of which have been reviewed on the *"Books to Read"* page of the *"M.M."* in recent months. If certain other details are added to the numbers, however, the list becomes really worth while.

It is always of interest to make a note of the depot to which an engine belongs, especially in these days of locomotive pooling, when one may often find an engine hundreds of miles away from "home." The shed indication may be on the smokebox door, on the buffer beam or on the side framing, according to the practice of the company concerned. Then there are the various forms of classification used by the different groups. L.M.S. engines, for instance, have their traffic classification, such as "7P," marked on the cab side; L.N.E.R. engines are classified according to their wheel arrangement, such as "A4," marked on the buffer beam; and G.W.R. engines are marked on the cab side with a coloured disc indicating their route classification according to their axle weight. On this G.W.R. coloured disc may be found a letter indicating the classification for power purposes.

The appearance of a new series of engines naturally provides excitement, but in the absence of anything as good as this, lots of fun can be had in noting the re-numbering of engines. Chief interest in this direction is found at present in the re-numbering scheme for L.N.E.R. engines. Even the changing of the names of certain locomotives is not unknown, and on the G.W.R. lineside watchers are keenly on the lookout for the appearance of nameplates on those 4–6–0s previously running without titles, although these have been allocated for some time. The colour of an engine also provides interest just now with the restoration of pre-war liveries and the adoption of the new locomotive finish on the L.M.S.

Engine notes made on the spot are most conveniently jotted down in a small notebook that can be carried in the pocket. Later they should be transferred to a large book having columns ruled to take the various details.

I can assure the "scoffers" that the preparation of a locomotive list including these details is full of interest and even excitement.

This Month's Articles

	Page
Icebergs Ahead! by Leslie E. Wells	398
Plastics in Everyday Life—II	400
British Steel in Bridge-Building	403
"Spitfire"	406
Bats, Glombs and Gorgons by John W. R. Taylor	410
Cromford Canal by Frank Rodgers	413
Ship Repair and Salvage—I by Denis Rebbeck, M.A.(Cantab.)	414

Air News, 418. Books to Read, 407. Club and Branch News, 426. Competitions Page, 435. Engineering Notes, 421. Fireside Fun, 437. From Our Readers, 434. H.R.C. Pages, 427–9. Meccano New Models, 424, Among the Model-builders, 422, Competitions, 425. On the Road, 417. Photography, 420. Railway Notes, 408. Stamp Pages, 431, 433.

Icebergs Ahead!

By Leslie E. Wells

ANYONE who has viewed an iceberg at a distance, from the comfort of an Atlantic liner, would agree that it is one of the most wonderful, if one of the most terrifying of all natural sights in the world. Glittering coloured peaks and pinnacles in the sunshine, vast caves and crevices, and torrential waterfalls on its various sides combine to make it something unique among Nature's marvels.

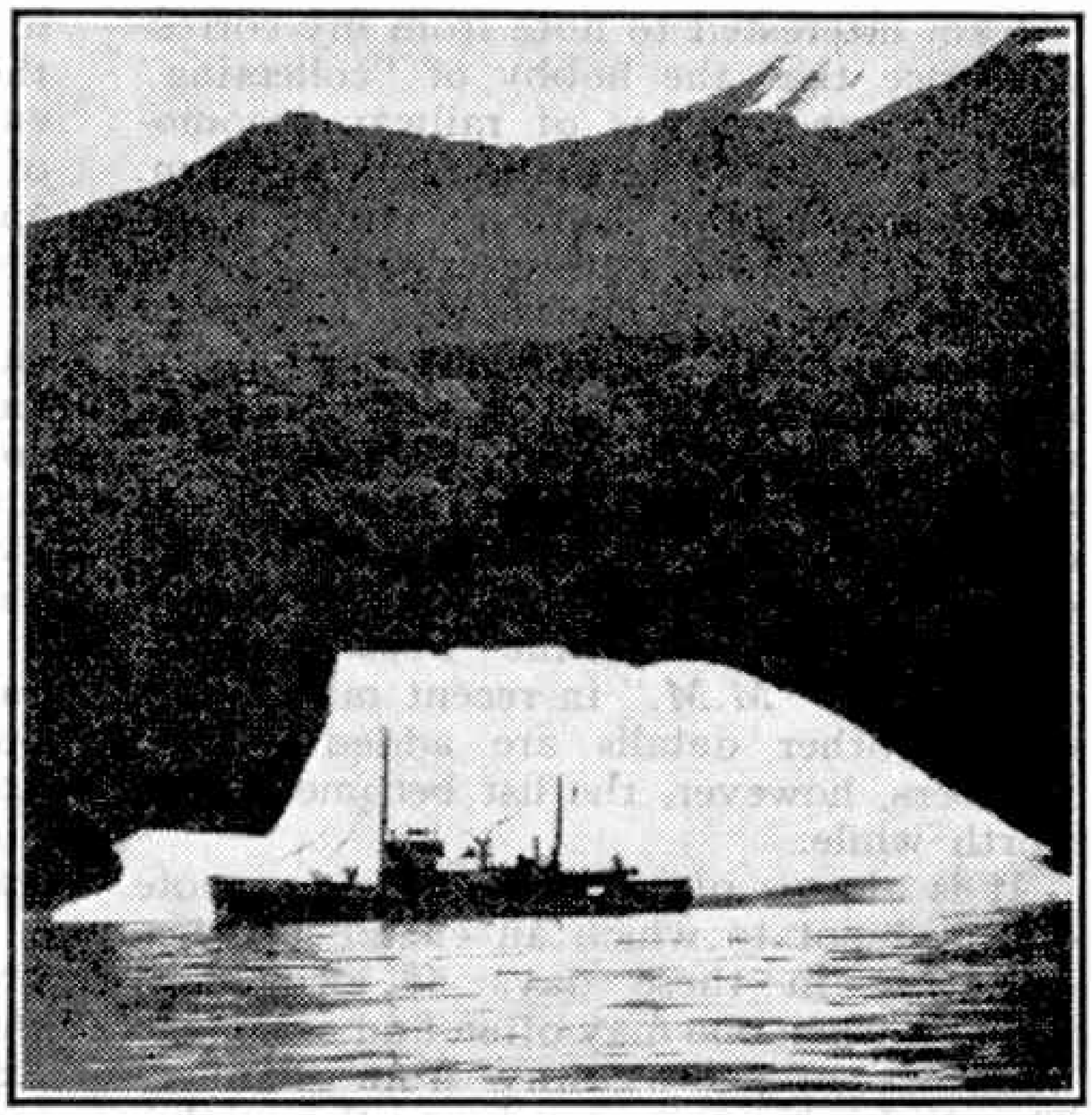
Icebergs are still the greatest menace to all who guide ships across the world's seas and it is only because of the magnificent work done by the International Ice Patrol that they no longer cause heavy loss of life and ships, as in days gone by. Since the patrol began, over 30 years ago, not one single human life has been lost at sea through collision with ice, which is indeed a great tribute to the patrolmen responsible for its efficient working.

Immediately an iceberg is spotted, men get busy determining its size, speed and drift, and they inform the U.S. Hydrographic Office and all ships of its exact position. In one season over 6,000 radio reports giving positions and movements were tapped out.

The cutters *"Pontchartrain"* and *"Champlain,"* based at Halifax, Nova Scotia, took turns at guarding the coast of this dreary region in order to warn all ships of the position of ice. One cutter was always on duty, and to afford continuity of records and a system of intelligent and authentic advice of conditions, an ice observation officer with a small staff remained continually in the ice area, transferring from cutter to cutter as each relieved the other. Supporting these two cutters in the duty was the 125-ft. oceanographic vessel *"General Greene,"* which was engaged in plotting currents so that shipping would be informed of the speed and direction of the bergs.

One of the pioneers of the Ice Patrol was Hagbard Ekerold, a Norwegian engineer. He journeyed to the island of Jan Mayen, well within the Arctic Circle, and established a primitive laboratory there, living alone on the desolate island, making hydrographical surveys, maps and accurate weather observations.

Ekerold knew that if his reports could be wirelessed to the United States naval station, one could arrive at a fairly reliable forecast of weather conditions in the North Atlantic. He began by mapping the position of moving icebergs. He suffered many setbacks, but eventually persuaded the United States Government to give him a wireless set. With this he returned to Jan Mayen and it was from there that the first vital messages were sent to the large transmitting station at Cape Race.

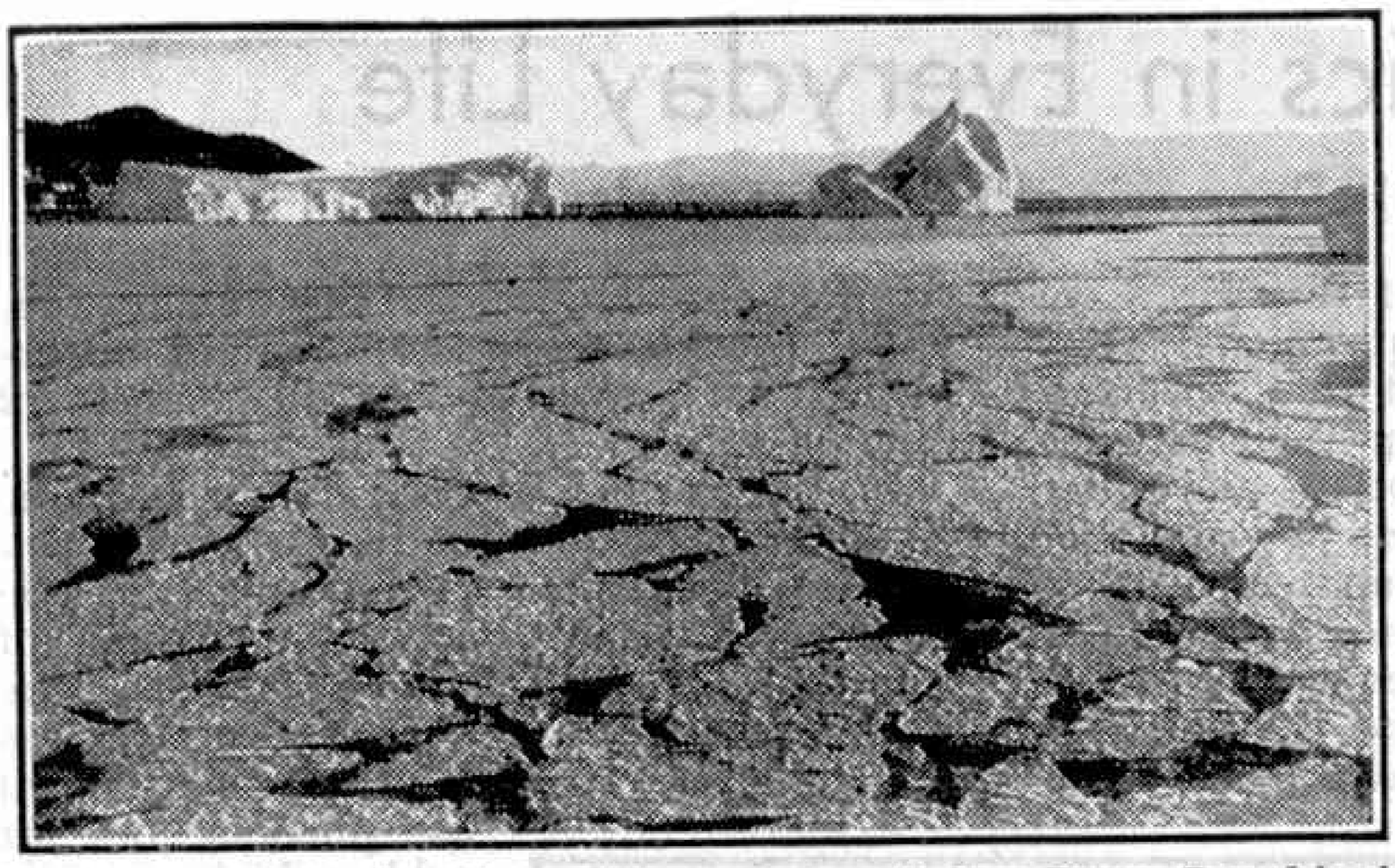


The United States patrol boat "Marion" in Disco Bay, Greenland.

So the Ice Patrol owes a great deal to his genius and endurance.

It was the sinking of the giant 46,000-ton liner *"Titanic"* on 14th April, 1912, with the loss of 1,500 lives, after colliding with an iceberg, that first aroused an international demand for safeguarding shipping against the menace of ice. Every year, in memory of those who lost their lives in this disaster, a salvo is fired from the deck of a cutter over the spot where she sank. This terrible catastrophe was the last of a series of similar disasters to all kinds of shipping, though in earlier years the reason for the sudden disappearance of vessels in the North Atlantic was often unknown at the time.

It was not, however, until 1913 that



Antarctic icebergs just given off by a glacier off Cape Evans, Ross Island, with pancake ice in the foreground.

the Conference for the Safety of Life at Sea was signed by representatives of 14 countries, thereby officially instituting the International Service of Ice Observation and Ice Patrol, to give this body its full title. The Conference decided that ships would patrol the ice regions during the season of danger from icebergs, that is from April to July, and attempt to keep the transatlantic lanes clear of derelicts during the remainder of the year. A derelict is just as menacing as an iceberg, for it drifts with the currents, quite uncontrolled and heedless of all recognised courses, and is likely to ram or be rammed in the fog or darkness.

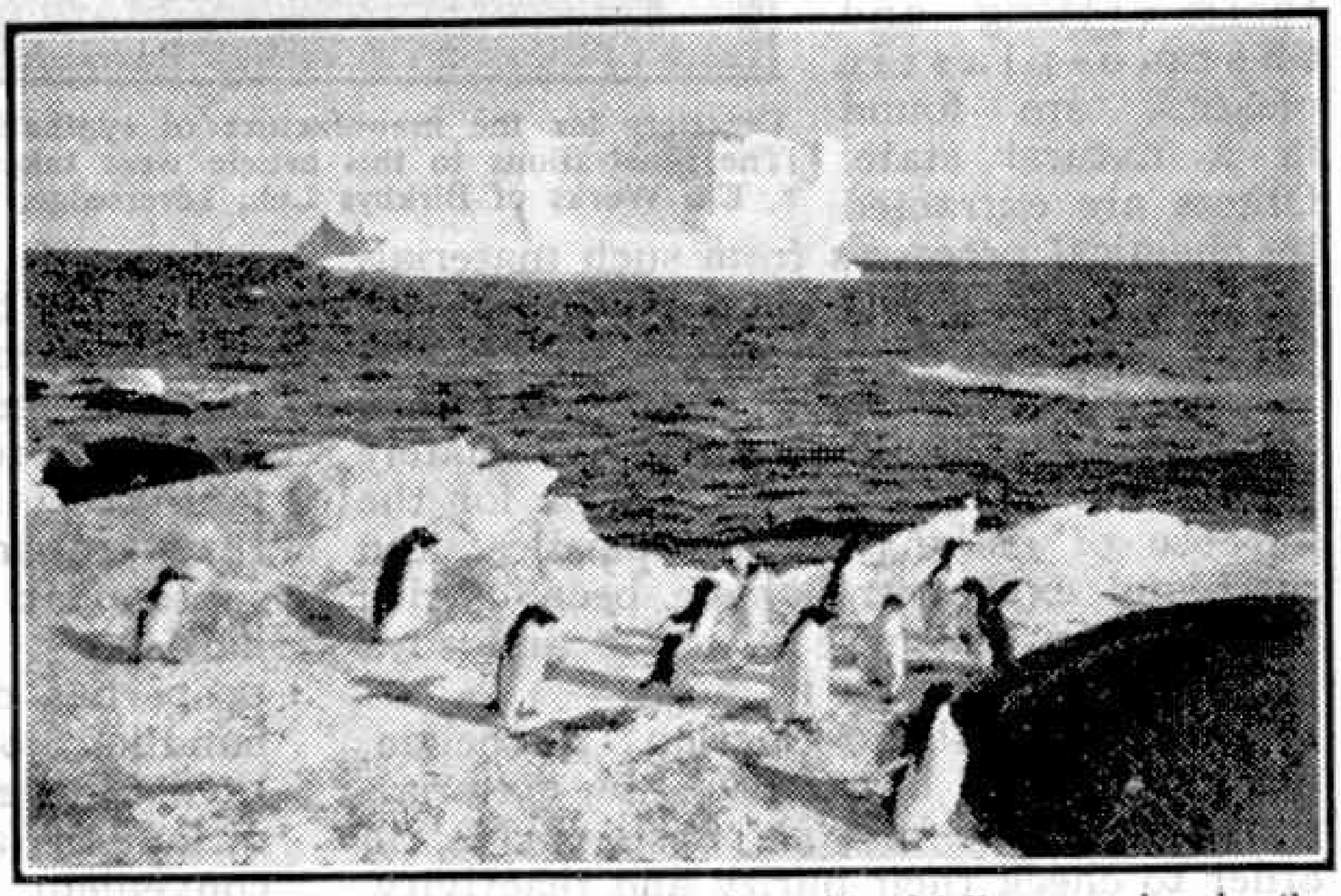
The first country to undertake the duty of patrol was the United States, and the Coast Guard was chosen by the President to carry out the work. To-day 14 nations share in its upkeep, according to the proportion of shipping under their flags using the danger routes. Great Britain makes the largest contribution, which amounts to £12,000 a year.

The area covered by the Ice Patrol lies mainly around the Grand Banks of Newfoundland, which for most of the year are blanketed in fog, rising off the confluence of the Gulf Stream and Labrador Current. And through it passes the world's heaviest ocean traffic, travelling blind. Not only must measures be taken to avoid icebergs, but also to avert collision between vessels travelling in opposite directions. Precautions against the latter are afforded by eastbound and westbound traffic lanes, 60 miles apart, which are shifted to the southward as the icebergs move in that direction.

For every cubic foot of an iceberg above the surface of the water there are at least eight cubic feet below, and in some cases only one-tenth part of an iceberg is visible. The sizes of icebergs vary. Some tower hundreds of feet into the air and sometimes they are nearly a quarter of a mile in length at the waterline. The largest of them are like real islands, with rugged cliffs, coves and mysterious inland lakes formed by the action of the Sun and wind.

A few years ago a captain saw four large bergs together, two of them rising 500 and 700 ft. respectively. Just imagine what must have been below water at this point. A berg having a height of 960 ft. also was observed, and another measured 50 miles in length. The tallest ever seen is said to have towered to a height of 1,700 ft. above sea level.

The bergs that appear in the North Atlantic each spring represent the overflow of the great ice cap which covers some 300,000 square miles of Greenland. They are the detached ends (*Continued on page 436*)



A fine tabular iceberg in the Antarctic, with Adelie penguins in the foreground.

Plastics in Everyday Life

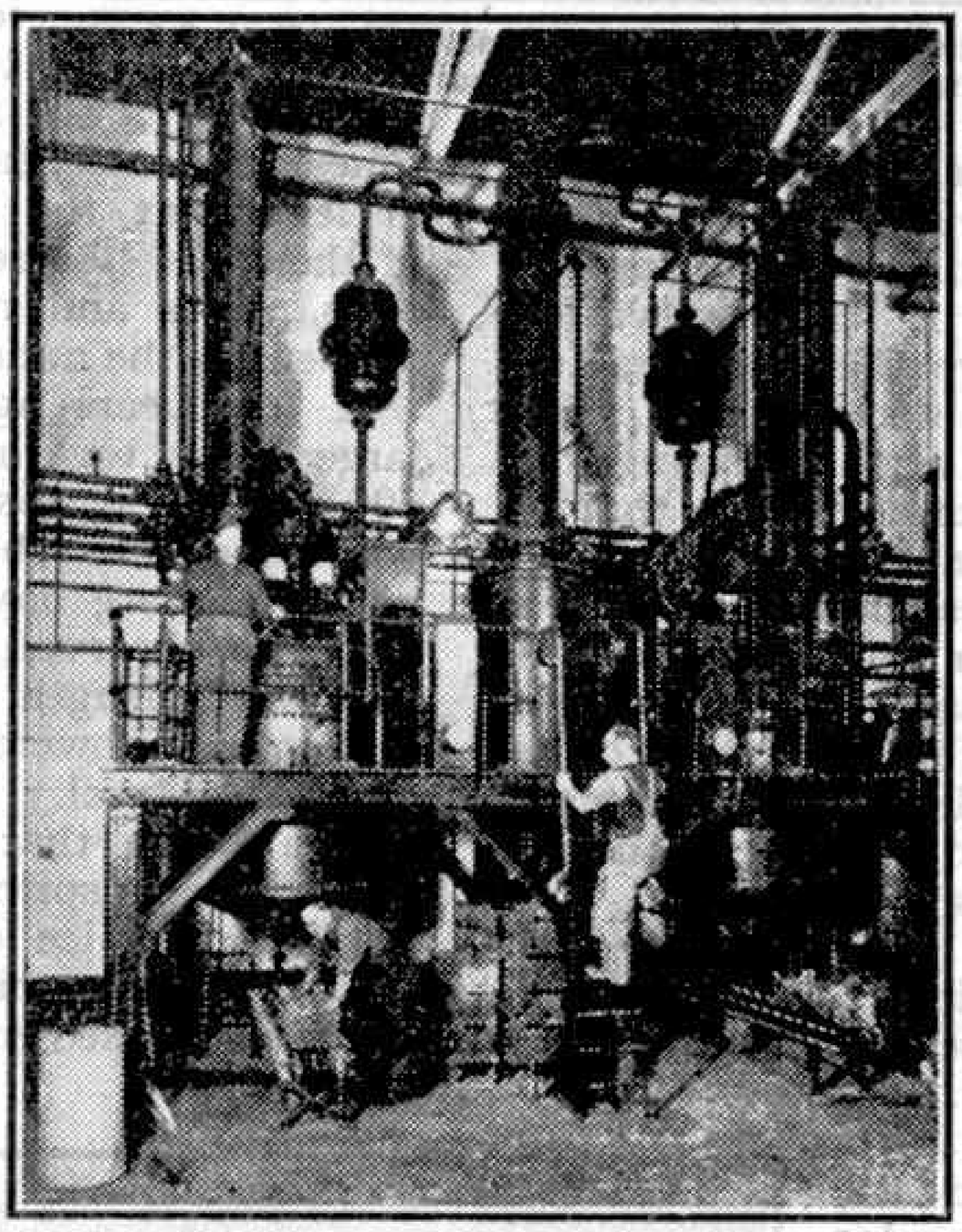
II—Preparing the Materials

IN the previous article of this series we set out to answer the question, "What are Plastics?" We learned that although plastics were first used, in their natural state, by the ancient Egyptians and other early civilisations, thousands of years ago, it is only within the last hundred years or so that efforts have been made with success by individual chemists to evolve synthetic plastics, and only since the beginning of this century have experiments been made to produce them commercially on a large scale. It is by reason of these later efforts to produce these materials that we refer to them as "new."

Now that we have a good idea of what plastics are, we shall want to know what materials are used for their manufacture, how such materials are treated, and what processes are used to produce the smooth, colourful and clean shapes with which we are familiar. The raw materials for the natural plastics, and for many of the thermosetting and thermo-plastic plastics, are found in a natural state. Others are extracted by chemical processes from such materials as timber, coal, oil, lime, natural gases, petroleum, cotton linters, wheat straw, brown coal, peat, rubber and other resins, and deposits of bitumen. It may ultimately be possible to utilise waste crops for the purpose of making certain plastics, and successful experiments have been carried out with surplus wheat, coffee and soya bean crops.

Before actual production is begun, tests are carried out on the raw materials from which the resin is to be made, in order to check their purity and reactivity, thus ensuring that a resin produced to a given formula and procedure has the required characteristics of the specification. Rigid routine tests and constant supervision are essential in all stages of manufacture.

First let us consider briefly the phenolic or phenol-formaldehyde resins, from which are produced the phenolic plastics, the largest and most important group of plastics. As their name implies, the phenolic resins are chemical derivatives of that group of organic materials known as phenols or tar acids, which occur in coal tar. The two most common members of the phenol group, and those which are most universally used for the production of resins are phenol and cresol. The other main reacting ingredient is formaldehyde. This is essentially a manufactured product, the starting point of which is coke, so that in common with the phenols it may be said to be a by-product of coal.



Digesters for the manufacture of synthetic resins. The illustrations to this article were taken at the Elo Works of Birkbys Ltd., Liversedge, Yorks.

The phenolic resins are produced in three forms—(a) solid, non-heat-hardening resin; (b) solid, heat-hardening resins, and (c) liquid, heat-hardening resins, of which there may be many variations to suit the particular application for which the resin is required. It may at once be asked why, if the property of heat hardening is so important, do we produce a resin which does not possess that property? The answer is, that by subsequent addition to such resins of a hardening agent, the heat-hardening properties may be introduced. Moreover, handling or manipulation of a non-hardening resin, with a subsequent addition of a hardening agent, is more convenient for certain processes than handling a resin of the heat-hardening type.

The production of the three types of

resins referred to above is effected by the choice of the agent or catalyst used to effect the combination of the phenol and formaldehyde. In all other respects their method of production is similar. This consists in its essentials of the following procedure.

A steam-jacketed still is charged with phenol (in its molten form) or cresol, to which is added the requisite amount of formaldehyde and from one quarter to five parts of the catalytic agent. The amount of formaldehyde may vary from 60–150 parts per 100 parts of phenol, and the nature of the catalyst is dependent upon the desired properties and form of the finishing resinous product. Thus, for the production of non-heat-hardening resins, an acid catalyst such as sulphuric, hydrochloric or oxalic acid may be used; for solid heat-hardening resins the most common catalyst is ammonia; and for liquid heat-hardening resins the use of caustic soda, sodium carbonate or sodium sulphate is quite usual. The still in which the ingredients are mixed is fitted with a paddle that keeps the reacting chemicals in motion during the whole of the process; and with a cooling condenser, which permits the condensation of vapours rising from the still.

When all the ingredients have been loaded into the still, steam is applied to its jacket and the mixture carefully heated up to its boiling point, at which temperature combination between the phenol and the formaldehyde begins to occur. The combination is accompanied for a time by the evolution of heat which may, unless due care is observed, result in extremely violent boiling and consequent loss of the charge by boiling over. The mixture is maintained at boiling point for a period of from 30 min. to 6 hrs., depending upon the type of resin; and during the whole boiling period the vapour is condensed in the condenser and returned to the still. At the end of this reaction period the still is further heated, and the issuing vapours are condensed but not returned to the still; while a vacuum is also applied to assist in the evaporation of the water and uncombined formaldehyde, of which the vapours primarily consist.

When the water has been removed, the resulting mass in the still is run out in the molten state into trays, in which it is quickly cooled to a transparent brittle resin; or, if it is liquid resin, it may be cooled in the still prior to discharge by passing cold water through the still jacket.

Filling the mixing machines prior to the dry mixing process.

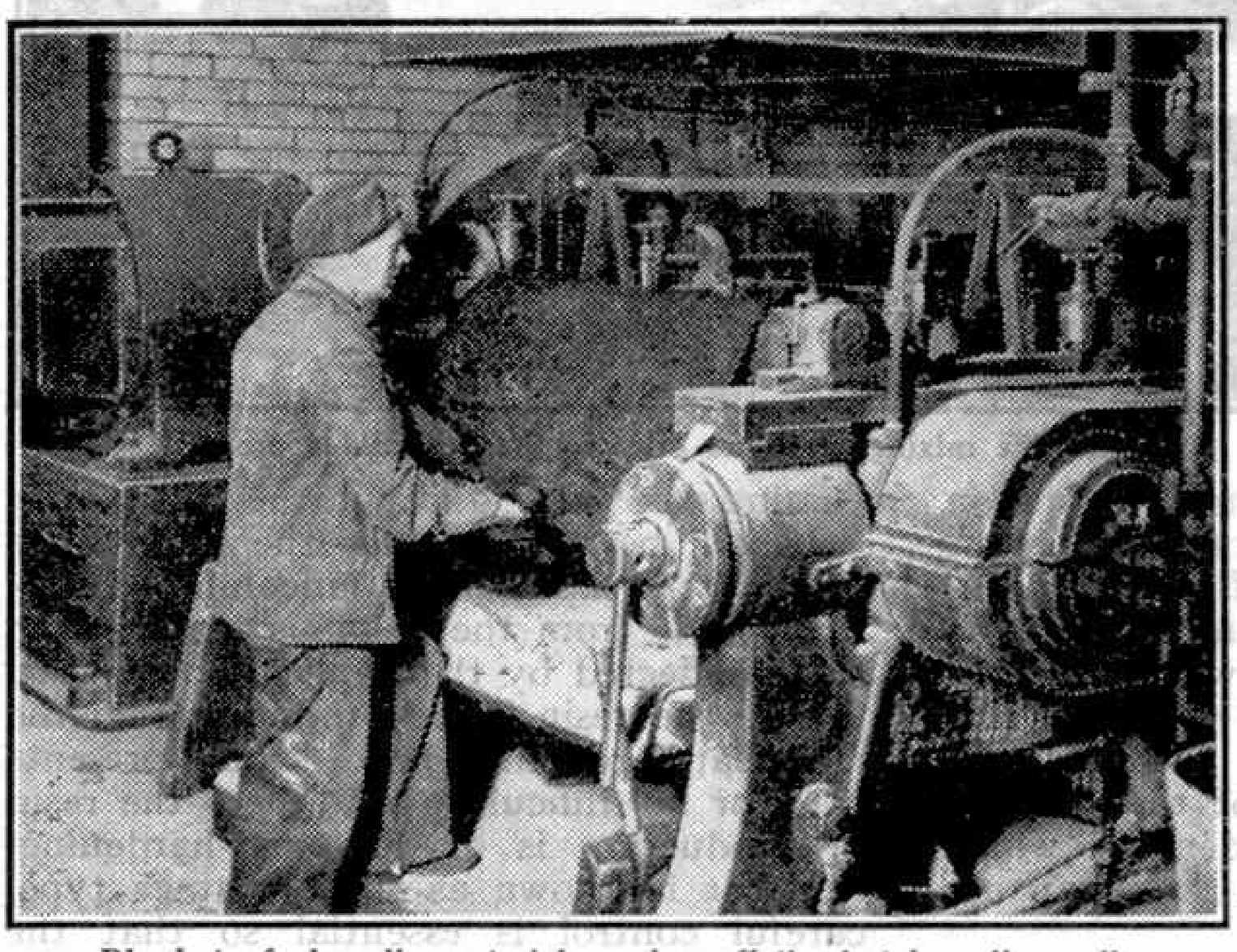
It will be noticed that the removal of the water vapour and uncombined formaldehyde from the resinous mass in the still is effected by the application of heat. Where the resin being produced is of the non-heat-hardening type, this presents little or no difficulty; but where the resin in production is of the heat-hardening, or what is known as the one-stage type, careful control is essential so that the discharge of the resin may take place at just that point where it possesses the correct physical properties. It is only by the most stringent control of both raw materials and manufacturing procedure that a consistent product can be maintained.

The heat-hardening or one-stage type of resin produced as described above is then ready for its application in industry. The non-heat-hardening resin is of relatively little value, and needs the incorporation of a hardening agent. The hardening agent most universally employed is a chemical known as hexamine, a white crystalline material produced by the addition of ammonia to formaldehyde. This product, if mixed in the proportion of approximately 10 per cent. with the powdered non-heat-hardening, or two-stage

resin, on subsequent heating possesses the property of handing over its formaldehyde content to the resin, the ammonia present acting as the catalyst, when the resulting product becomes heat-hardening.

One of the most important uses of phenol-formaldehyde resin is for the production of moulding compositions which generally are in powder form, although in certain cases they may be in flake, broken biscuit, or "fluffy" form. In whatever form they may be, however, they are generally referred to as moulding powders.

A phenolic moulding powder consists essentially of a phenol-formaldehyde resin with which is incorporated a filler, colouring matter, a lubricant to prevent sticking to the moulds during the moulding operation, and an anti-staining agent such as lime or magnesia. The phenol-formaldehyde resin may be either a one-stage or heat-hardening resin, or it may be a two-stage or non-heat-hardening resin; in the latter case sufficient hexamine is also incorporated to convert the non-hardening resin into one which will harden by the application of heat. Owing to the greater ease with which this latter type of resin can be handled, and the consequent greater degree of uniformity in the finished product, it is almost universally used for moulding-powder manufacture, although in some special cases properties may be required either in the moulding powder itself, or in the article to be moulded from it, which can only be obtained by the use of a one-stage resin.



Blanket of phenolic material coming off the hot kneading rolls.

General-purpose moulding materials are normally manufactured by a dry mixing process. In this process the resin, which previously has been ground to powder, is intimately mixed with the other ingredients in a blending machine, from which the mixture is fed on to a rolling machine. The rolling machine consists of two cored steel rollers horizontally disposed, capable of being steam heated or water cooled; these rollers are arranged to revolve, one clockwise and one anti-clockwise, so that they turn towards one another when viewed from above. A knife-like device is provided for each roller so that any material adhering to it may be cut or scraped off. The temperature of one roller is maintained at 250–270°F. and that of the other at 150–170°F.

The heat of the rollers, together with the heat generated by friction in the passage of the mixture between them, is sufficient to flux the resinous constituent of the mixture, thereby turning the whole mixture into a soft plastic mass, and impregnating, or partially impregnating, the filler with the resin. The mass adheres to the rolls and is mixed on them continuously for about 10 minutes, when it is cut off, by means of a knife, in the form of a soft plastic blanket, which when cooled becomes quite hard, at which stage it is broken up and ground into the state in which it is required for use by the moulder.

The temperature and duration of processing on the rolls has a very pronounced influence on the properties of the final product. In practice, therefore, large quantities of the powder produced from the cooled sheet after removal from the rolls are blended together in order to smooth out minor irreularities, and to permit the production of large batches of material with consistent properties throughout.

The formulæ which may be employed for the manufacture of moulding powders vary considerably, depending upon the type of resin used and on the character of the fillers employed. The following is a typical mixture for a general purpose, woodfilled powder:

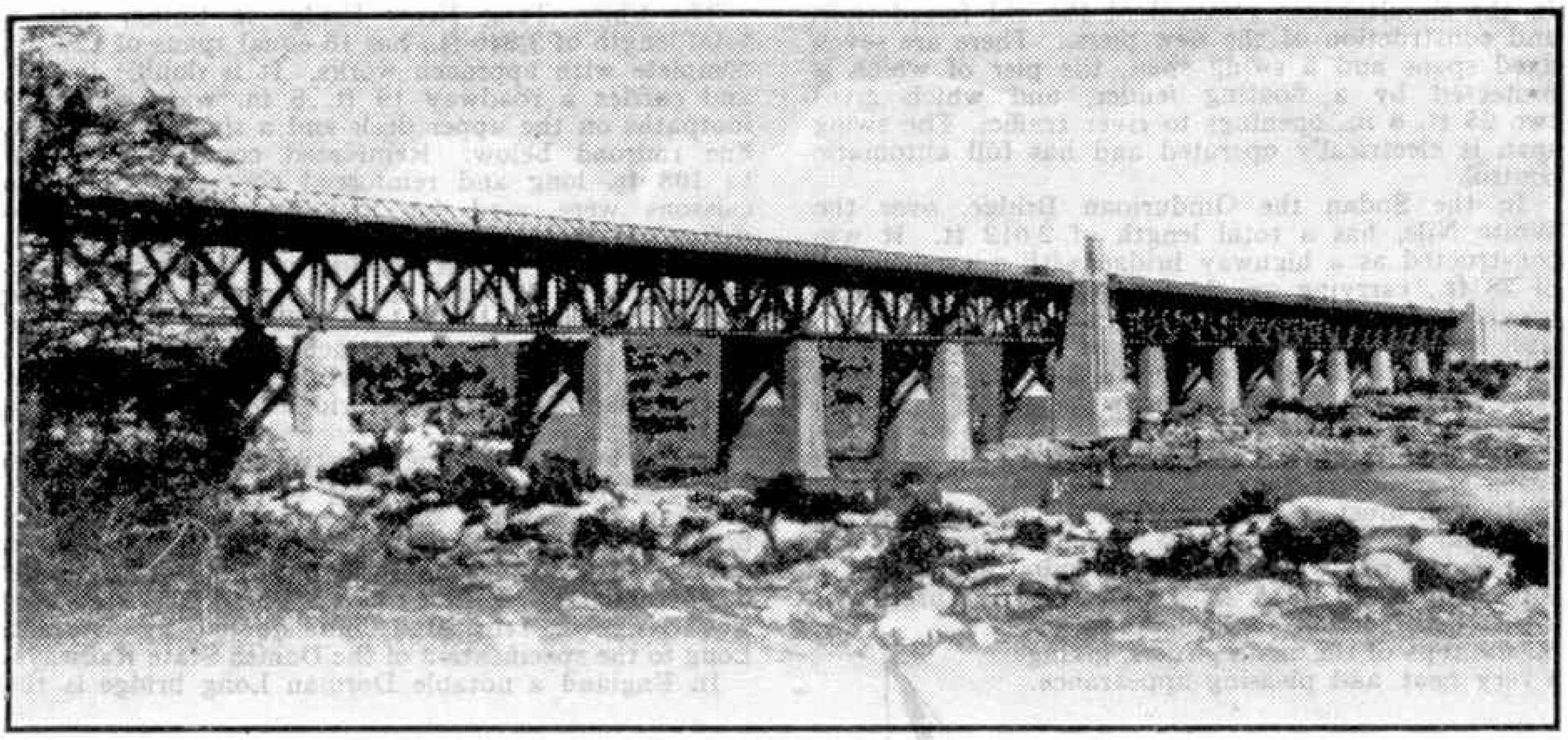
Non-hardening Resin	50	parts by weight
Hexamine	6	,, ,,
Woodflour	50	,, ,,
Hydrated Lime..	2	,, ,,
Stearic or Oleic Acid (Lubricant)	1	,, ,,
Pigment or Dye..	2	,, ,,

In addition, there may be incorporated up to 3 per cent. of a plasticiser to facilitate fluxing of the mixture when it is fed on to the heated rolls.

Although the nature of the phenolic resin used has a very large bearing on the quality and properties of the moulding powders and mouldings produced from it, the type of filler employed is even more important in its effect on the properties of the resulting products. While the fillers may in many cases act merely as diluents to reduce costs, they almost invariably facilitate moulding-powder production and assist in ease of moulding; more important still, they give the finished moulding desirable properties which would be unobtainable otherwise .and for this reason the type of filler which is chosen for incorporation in a moulding powder depends upon the properties required in the mouldings produced from it. Fillers may be divided into two main classes—cellulosic and mineral.

Woodflour is the filler most commonly used for general purposes. Moulded pieces produced from woodfilled materials possess reasonable strength characteristics and are fairly resistant to ingress of moisture, while they have a very good general appearance. Woodflour consists of sawdust that has been ground to a fineness of approximately 90 mesh (that is it is capable of passing through a sieve containing 90 meshes per linear inch) and which is free from "spelks" or small needle-like splinters that would show up under critical examination of a finished moulding. This fineness of texture is achieved by grinding the wood in a slightly damp or humidified condition, which reduces its splintering tendencies. The type of wood chosen is most important, the best woodflour being obtained from the soft woods, since they are low in natural resin content.

Cotton fillers may take the form of pulverised cotton in which the fibres have been considerably reduced in length by grinding until the product is a fluffy powder; or they may consist of chopped thread or cord, or chopped pieces of woven fabric, which may be relatively fine like shirt cuttings, or relatively coarse as heavy canvas duck. In the majority of cases where higher impact-strength values are required, cotton is used to replace (*Continued on page 436*)



Limpopo Bridge, South Africa.

British Steel in Bridge-Building

THE world-famous Middlesbrough steel firm of Dorman Long and Company Limited, have recently issued a booklet giving an account of some of the outstanding works of construction carried out by them during the past thirty years. Prominent among these structures are many fine bridges. Some of these have already been described in the "*M.M.*," but it is of great interest to have the opportunity of surveying them as a whole, because they provide a remarkable picture of the success of British-made steel in all parts of the world.

The most striking of these great structures is the Sydney Harbour Bridge. This is the most heavily loaded and the second longest arch bridge in the world, the longest being the bridge across the Kill van Kull waterway leading into New York Harbour, which exceeds it by 2 ft. 1 in. It was built for the New South Wales Government, and the complete construction of the bridge, including the manufacture and erection of the steelwork and the whole of the civil engineering, was carried out by Dorman Long in accordance with designs prepared by their consulting engineer, Mr. Ralph Freeman, M.Inst.C.E. The whole of the high-tensile steel used in the construction of the bridge was rolled at the company's mills at Middlesbrough and shipped to Australia. Fabrication was carried out in Australia in workshops built by the company for this purpose on the bridge site.

The total length of the bridge is 3,770 ft. and the length of the main span is 1,650 ft., the width between parapets being 160 ft. The bridge crosses Sydney Harbour in a single span at a clear height of 170 ft. above the water, and carries four railway tracks, a 57-ft. roadway, and two 10-ft. footways. The arch span, which rises to a height of 440 ft., is flanked by massive masonry pylons with five steel approach spans on each side of the harbour.

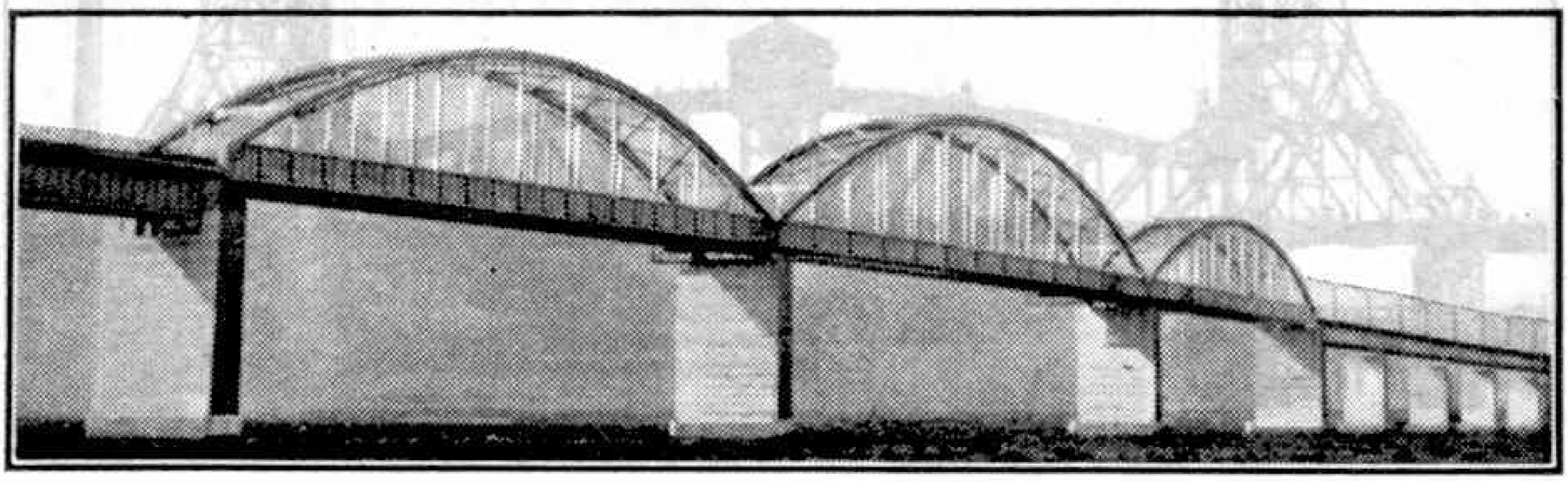
Another single arch structure is the Birchenough Bridge, Rhodesia, which carries an important trunk road over the Sabi River. The total span measures 1,040 ft. The steel arch was cantilevered out simultaneously from opposite sides of the river, being tied back by steel cables anchored in the rock of the river banks.

Several other important African bridges have been built by Dorman Long with steel rolled at the Company's Middlesbrough works.

The Otto Beit Bridge over the Zambesi River, Northern Rhodesia, is remarkable for its economical design. It is notable also as the only example, outside the American continent, of a suspension bridge built with cables of parallel wire construction. The special cable-spinning arrangements were developed by Dorman Long in conjunction with the consulting engineer Mr. R. Freeman. The total length of the bridge is 1,210 ft.; the main span measures 1,050 ft.

The Khedive Ismail Bridge, Cairo, Egypt, which has a total length of 1,250 ft., was built on the site of an earlier structure that had to be demolished, and the chief interest in carrying out the work lay

Storstrom Bridge, Denmark.



in the simultaneous removal of the old foundations and construction of the new piers. There are seven fixed spans and a swing span, the pier of which is protected by a floating fender, and which gives two 65 ft. 6 in. openings to river traffic. The swing span is electrically operated and has full automatic control.

In the Sudan the Omdurman Bridge, over the White Nile, has a total length of 2,012 ft. It was constructed as a highway bridge with a carriageway of 28 ft., carrying an electric tram track and with provision for two cantilevered footways 11 ft. 6 in. wide to be added when required. The foundations were formed by sinking pneumatic caissons with steel shells into the rock below the river bed, and two long earth-filled approach banks led on to the ends of the bridge. There is an electrically-operated swing span 304 ft. long.

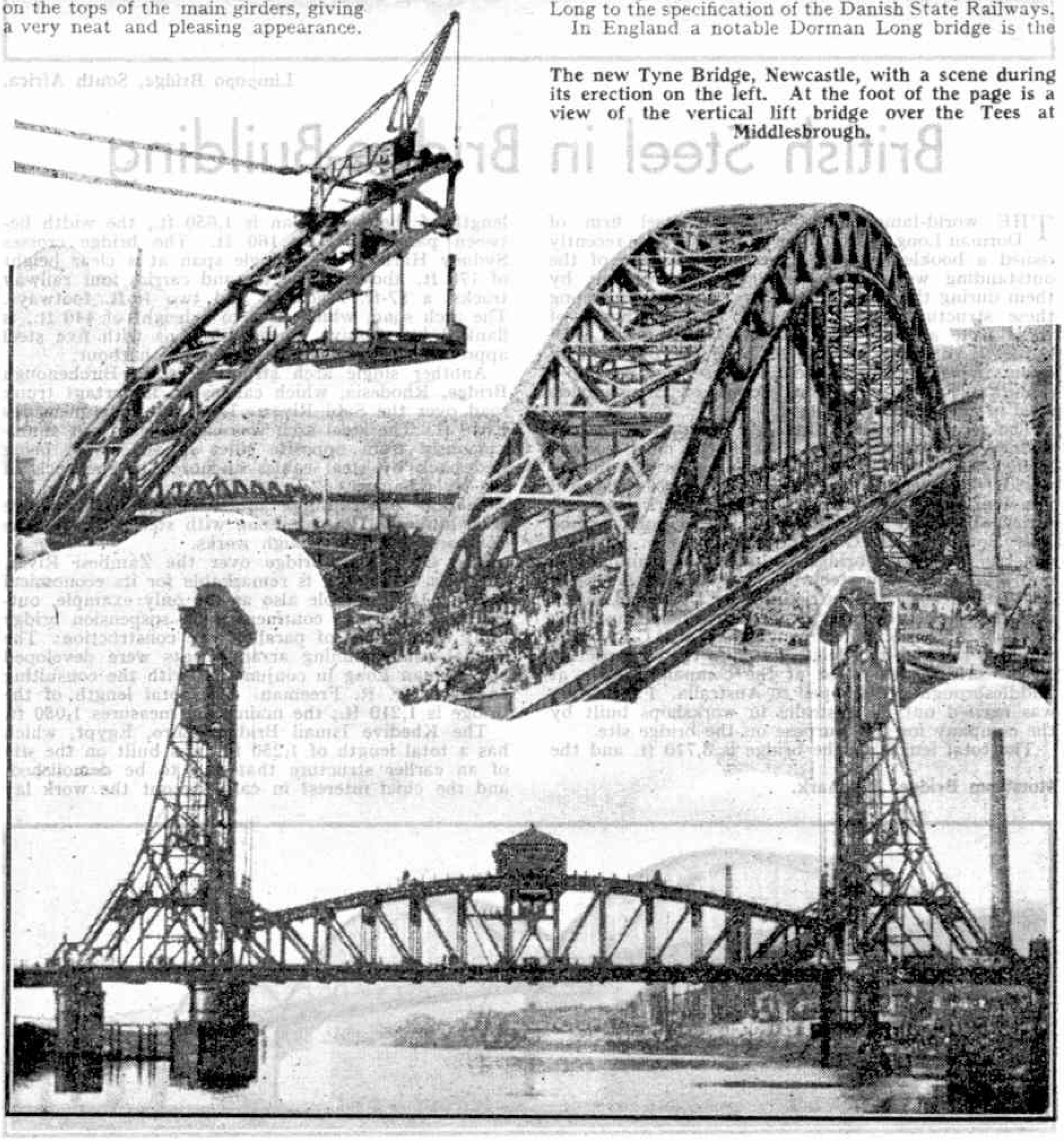
Mention must be made also of the bridge over the Limpopo River, South Africa, which carries a railway line and a roadway. It has 14 equal spans and a total length of 1,515 ft. The superstructure is of lattice construction, carrying the deck on the tops of the main girders, giving a very neat and pleasing appearance.

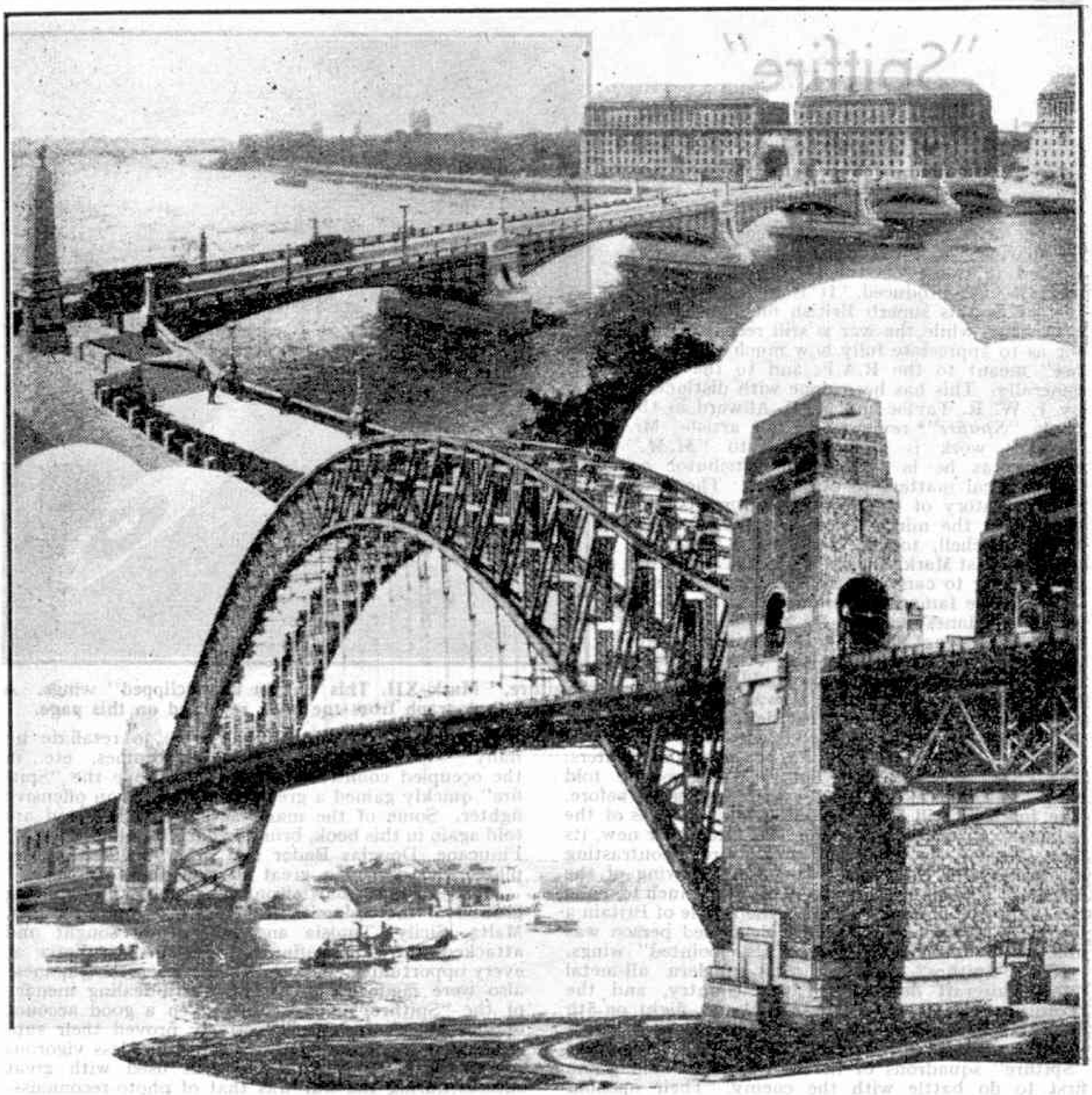
The Chien Tang River Bridge in China, with a total length of 3,840 ft., has 16 equal spans of 220 ft., complete with approach works. It is double decked and carries a roadway 19 ft. 8 in. wide with two footpaths on the upper deck and a single-track main line railroad below. Reinforced concrete piles up to 108 ft. long and reinforced concrete pneumatic caissons were used for foundations. Considerable difficulties had to be overcome in the construction of the foundations on account of the swift current in this river. Another Far Eastern structure is the Bangkok Memorial Bridge in Siam. This bridge consists of two lattice approach spans and a central double-leaf bascule span, giving a clear opening to river traffic of 197 ft. The bridge measures 755 ft. in total length.

Nearer home is the fine Storstrom Bridge, Denmark, which carries road and railway across the wide strait dividing the islands of Zeeland and Falster. The bridge has a total length of 10,535 ft., the main navigation span measures 447 ft. 5 in., and the clear height under navigation spans is 85 ft. The structure was designed, fabricated and erected by Dorman Long to the specification of the Danish State Railways.

In England a notable Dorman Long bridge is the

The new Tyne Bridge, Newcastle, with a scene during its erection on the left. At the foot of the page is a view of the vertical lift bridge over the Tees at Middlesbrough.





The giant arch of Sydney Harbour Bridge. Above it is the new Lambeth Bridge.

New Tyne Bridge at Newcastle, which has a total length of 1,254 ft. The main span, which measures 531 ft., is founded on four caissons sunk under compressed air, each containing 10,400 tons of concrete, surmounted by handsome granite-faced pylons. The main arch was built by cantilevering the steelwork simultaneously across the river from both piers, each half span being tied back by wire ropes attached to the top chords. All steelwork was fed forward from each side in order to comply with a contract condition forbidding any obstruction of the waterway during erection.

A structure of a very different type is the vertical Lift Bridge over the River Tees at Middlesbrough. This is one of the largest lifting bridges in the world, having a total length, including approach spans, of 4,920 ft., the length of each span being 270 ft., and the clear height over water with the span raised 120 ft. The bridge, which was designed to carry a moving load of 100 tons, allows for the passage of ocean-going steamers up the River Tees. Many interesting problems were presented and handled during the construction of the foundations and erection of the steelwork, as river traffic had to be maintained without interruption during the whole building period. The lifting span is electrically operated and automatically controlled, and can be raised or lowered in 1¼ minutes.

Still another type of bridge is the fine New Lambeth Bridge, London, which has a total length of 776 ft. 4 in. in five spans and a width between parapets of 60 ft. Building this bridge over the River Thames in the heart of London involved the demolition of the original suspension bridge and the erection of a temporary footbridge to take its place during the reconstruction.

Finally must be mentioned the interesting task of reconstructing Telford's Suspension Bridge over the Menai Straits, North Wales. The dismantling of the original bridge and its replacement by a modern structure capable of carrying full Ministry of Transport loading was a difficult job, as the structure had to be open to traffic during the whole operation. The existing piers were modified to carry the new superstructure, and the anchorage chambers deep in the rock at each end were enlarged. The 16 wrought iron chains were replaced by four high-tensile steel chains, and the deck was entirely reconstructed in greater width.

"Spitfire"

The Story of a Great Fighter

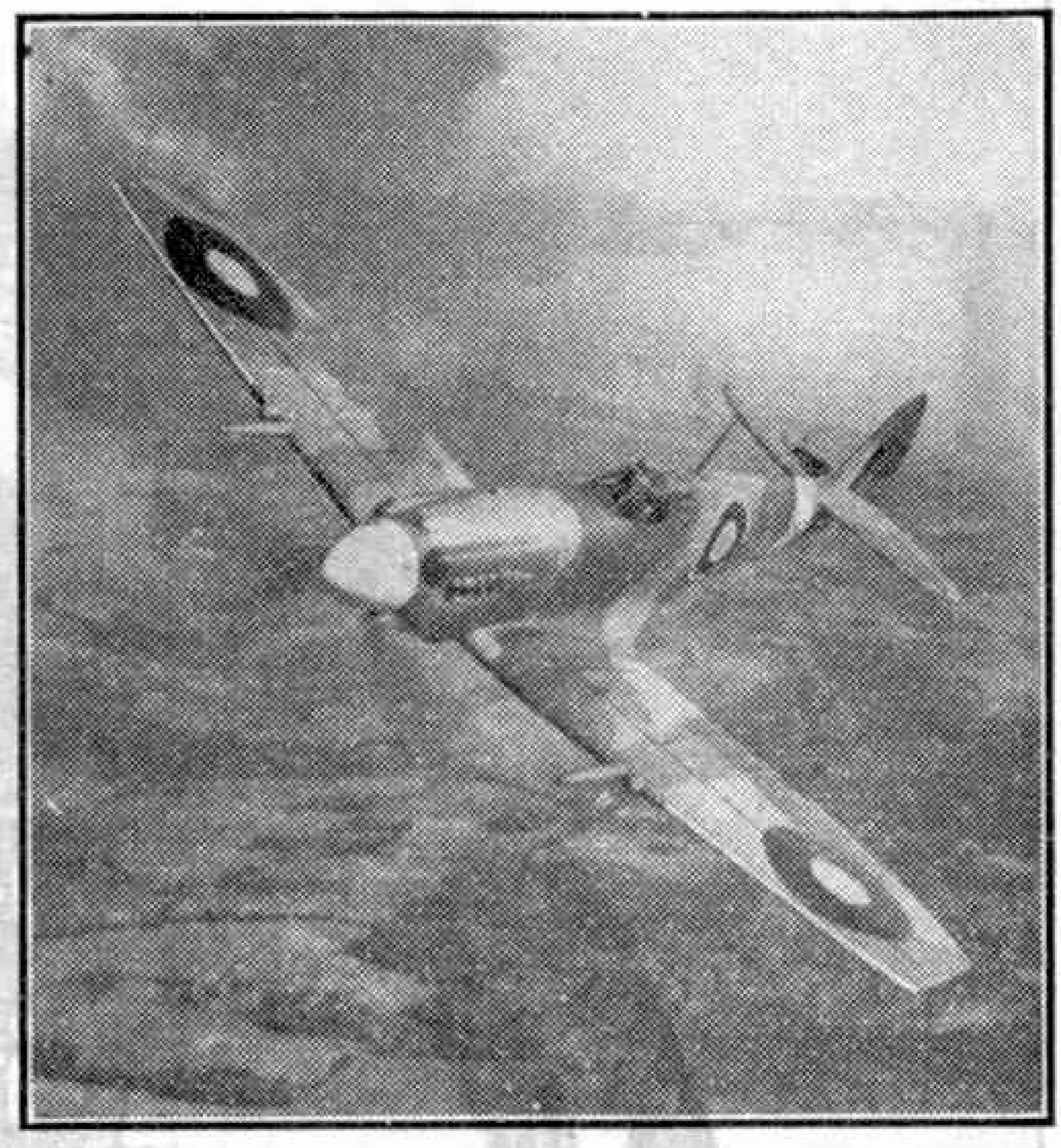
THE achievements of the Vickers Supermarine "Spitfire" during the recent war proved it to be one of the greatest fighter aircraft ever produced. It is fitting that the history of this superb British machine should be written while the war is still recent enough for us to appreciate fully how much the "Spitfire" meant to the R.A.F. and to the Allies generally. This has been done with distinction by J. W. R. Taylor and M. F. Allward in the book "*Spitfire*"* reviewed in this article. Mr. Taylor's work is well known to "*M.M.*" readers, as he is a regular contributor on aeronautical matters to our pages. The book tells the story of the "Spitfire" from its conception in the mind of the designer, the late R. J. Mitchell, to the time, early this year, when the last Mark was made and the "Spiteful" came along to carry on the splendid tradition.

When the famous Supermarine S.6 and S.6b racing seaplanes designed by Mitchell had won the International Schneider Trophy for Britain in 1929-31, he knew that the lessons learnt in producing and flying them could be applied to other types of aircraft. It was the efforts and skill of Mitchell and his design staff in utilising this and subsequent knowledge that produced the F7/30 four-gun and F5/34 eight-gun fighters. The F5/34 was the first "Spitfire", and we are told that "nothing like it had ever been seen before. The fuselage still bore the unmistakable lines of the Schneider racers, but the wing was altogether new, its thin aerofoil section and small area contrasting strangely with the large thick, cranked wing of the F7/30." It was the wing shape that did much to make the "Spitfire" famous, as during the Battle of Britain a few years later, even the least airminded person was able to recognise a "Spit" by its "pointed" wings.

The "Spitfire" was the first modern all-metal fighter aircraft designed in this country, and the prototype machine made its initial test flight on 5th March 1936. The first "Spitfire" squadron was formed in 1938, and when war broke out the following year "Spitfire" squadrons of the R.A.F. were among the first to do battle with the enemy. Their opening engagement came on the 16th October, 1939, when the Luftwaffe attempted to destroy the Forth Bridge. Four of the raiders were shot down, three of them by "Spitfires" and "Gladiators" of the Auxiliary Air Force. This first combat is illustrated in the frontispiece to this book.

We are told of the months of "tip and run" raids by the enemy, upon the East Coast and upon shipping, and of how convoy patrol became one of the regular jobs of the "Spitfire" squadrons. Their first really big scale action was the Battle of Britain, when, working with the famous "Hurricane" squadrons, they played a magnificent part in smashing the Luftwaffe's all-out assault upon this country that was to be the prelude to invasion. How far away those grim days now seem! In the course of their vivid account of that tense period the authors recall the satisfying fact that "in the ten days up to August 18th the Luftwaffe lost nearly seven hundred machines, their twisted blackened frames littering the golden harvest fields of Kent and Sussex and the pretty hills and woods of Surrey, or rusting beneath the inhospitable waters of the English Channel."

In this great air battle and the many subsequent actions against enemy raiders the "Spitfire" established itself as a defence fighter of the first rank. When the period of heavy raids by the enemy ceased and



"Spitfire," Mark XII. This version had "clipped" wings. A fine photograph from the book reviewed on this page.

R.A.F. Fighter Command had time to retaliate by daily "sweeps" upon enemy aerodromes, etc., in the occupied countries of western Europe the "Spitfire" quickly gained a great reputation as an offensive fighter. Some of the many actions of this kind are told again in this book, bringing back to mind "Paddy" Finucane, Douglas Bader and other brilliant fighter pilots who played a great part in those sweeps.

More distant battlefronts became the hunting ground of the indomitable "Spitfire," and in Libya, Malta, Sicily, Tunisia and Italy they sought and attacked the Luftwaffe and Italian Air Force at every opportunity. The time came when the Japanese also were made aware of the death-dealing menace of the "Spitfire," and we are given a good account of how these machines effectively proved their superiority over the crafty Eastern foe. A less vigorous role in which the "Spitfire" was used with great success during the war was that of photo-reconnaissance, and it is interesting to learn that they were first used in this capacity as early as December 1939.

The "Spitfire," like the "Hurricane," was eventually adapted for duty with the Fleet Air Arm, and the F.A.A. version of the "Spitfire" was named "Seafire." The work of these machines is the subject of a special chapter. Tribute is also paid to the splendid work of ground crews and salvage squadrons in keeping the aircraft, whether R.A.F. or F.A.A., in fighting trim, and in getting damaged machines back into service as quickly as possible; work that was often done under the most trying conditions.

Finally, for the more technically-minded reader, there are detailed descriptions of the main structural features of both "Spitfire" and "Seafire," and a chronological list of the specifications and dimensions of the successive Marks of these machines. The excellence of the text is equalled by that of the illustrations. Of these there are over 200. They show every phase of the work of the "Spitfire" during the war and include many fine action pictures. There are also many good line drawings illustrating structural features of the aircraft.

"*Spitfire*" is definitely "a book to possess."

---

* "*Spitfire*" *by John W. R. Taylor and Maurice F. Allward. Harborough Publishing Co. Ltd. 15/- net.*

BOOKS TO READ

Here we review books of interest and of use to readers of the "M.M." With the exception of those issued by the Scientific and Children's Book Clubs, which are available only to members, and certain others that will be indicated, these should be ordered through a bookseller.

"L.B. & S.C.R. LOCOMOTIVES"
By F. Burtt (Ian Allan Ltd. 3/6)

The author of this latest addition to the Ian Allan productions is himself a former "Brighton" man, who many years ago published an excellent L.B. & S.C.R. locomotive history, and his present book is of special interest in this centenary year of the London, Brighton and South Coast Railway. Younger readers who know the Brighton line only as an important section of the S.R. that is mostly electrified will follow with interest the details of the steam locomotives that have worked its traffic in the past, some of which still continue to do so on certain sections and services. Older readers will recall the glamour surrounding the engines of the "*Southern Belle*" and other famous "Brighton" trains.

The author first refers to the Brighton locomotive superintendents from 1870 onward, and then deals with their productions, beginning with the Stroudley engines, all of them six-wheelers conforming to a definite standard of external appearance, simple but pleasing. Stroudley's reign was literally a locomotive "Golden Age," for the passenger engines were golden yellow in colour and elaborately lined, while each had its own driver, whose name was painted up in the cab, and all were maintained in a state of extreme cleanliness. The regime of R. J. Billinton that followed saw the introduction of bogie express and tank engines. Then came the Earle Marsh period, during which locomotives became bigger, superheating was introduced, and Stroudley's picturesque yellow became umber brown. The big express tank engine policy that began during the Marsh period was further developed when L. B. Billinton took charge.

This locomotive review, which is well illustrated, covers many famous locomotive classes. From "Terriers," "Jumbos," "Gladstones," and their contemporaries we pass to the slender "Grasshoppers" and the finely-named 4–4–0s of the early 1900s, and to the portly "Atlantics," so closely related to the products of Doncaster, and the big "Baltics." Then we come to the final Brighton design of pre-grouping days, the 4–4–0s of class B4X that were christened "Greybacks" in view of their temporary livery owing to the impending grouping of 1923. General details, dimensions, names, numbers and dates are given, with notes of interest on individual engines and their performances.

The book can be obtained from the A.B.C. Locomotive Books, Mail Order Dept., 33, Knollys Road, Streatham, London S.W.16, price 3/9 post free.

"THE MODEL AIRCRAFT HANDBOOK"
By William Winter (Harrap. 8/6 net)

This is an English edition of an excellent American book on model aircraft design and construction. It is written by one of the foremost aeromodellers in the United States, who has completed over 1,000 machines of all types and now makes his knowledge and experience available to other enthusiasts.

Every aspect of the subject is dealt with, beginning with explanations of the different types of model aircraft and of model aerodynamics, and passing on to the preparation of working plans and actual construction. A chapter of special interest to the more advanced model-builder deals with miniature petrol engines. Indoor model aircraft are not neglected, and hints on their construction are followed by practical instruction in the flying and adjustment of these and also of outdoor flying models. Some 3-view drawings of a selection of model aircraft, and an excellent glossary round off the book, which is well illustrated.

"THE ROBINSON LOCOMOTIVES OF THE GREAT CENTRAL RAILWAY"
By C. Langley Aldrich

This useful book is a non-technical summary dealing with the locomotives produced under Mr. J. G. Robinson, whose regime at Gorton covered nearly the whole of the separate existence of the Great Central Railway from 1900 to 1923. In spite of the growth in size of locomotives during this time, the Robinson engine remained a model of neatness.

The story commences with the passenger tender engines, proceeding from the "Sir Alexanders," which made the running in the early years of this century, to the "Improved Directors," of which the latest were constructed under L.N.E.R. auspices for work in Scotland. The varying mixed traffic 4–6–0s have a section to themselves, as also have the freight and tank engines respectively, and the fine 4–2–2 Pollitt single-drivers. Further sections deal with various points of interest such as locomotive livery, the successive locomotive superintendents at Gorton, and the Great Central locomotive stock existing when the L.N.E.R. was formed. Special attention is given also to the effect of the L.N.E.R. re-numbering scheme. Finally there is a useful table of dimensions of all the Robinson classes. There are 25 illustrations.

Copies of the book are available at 4/10 post free from the publisher, E. V. Aldrich, 104, Grove Crescent, Kingsbury, London N.W.9.

"A.B.C. OF G.W.R. LOCOMOTIVES"
(Ian Allan Ltd. 1/6)

This seventh edition of the now familiar "*A.B.C. of G.W.R. Locomotives*" provides a complete numerical list of G.W.R. engines class by class, together with their names where they apply. Engines of Swindon origin taken over in the process of grouping are specially indicated, a useful feature for youthful "spotters." Many of the various classes are illustrated.

Copies of the book can be obtained from A.B.C. Locomotive Books, Mail Order Department, 33, Knollys Road, Streatham, London S.W.16, price 1/8½ post free.

"RAILWAYS QUIZ"
(Transportation Press Ltd., Tudor Chambers, London N.22. Price 1/–)

Here are 400 questions on railway topics, complete with answers. The subjects are widely varied and include topics connected with statistics, railway expressions and numerous odds and ends. There is a certain amount of ambiguity in some of the questions asked, which also affects the answers, while on the double page illustration of a "Merchant Navy" 4–6–2 the unusual term "fuelbox" is used for the fire-box. No doubt this is merely a slip that will be amended in any future editions. Finally there is an interesting invitation to readers to supply further questions.

"TITANS OF THE TRACK (L.M.S.)" No. 2 (2/–
"TITANS OF THE TRACK (S.R.)" No. 2 (1/6
Ian Allan Limited

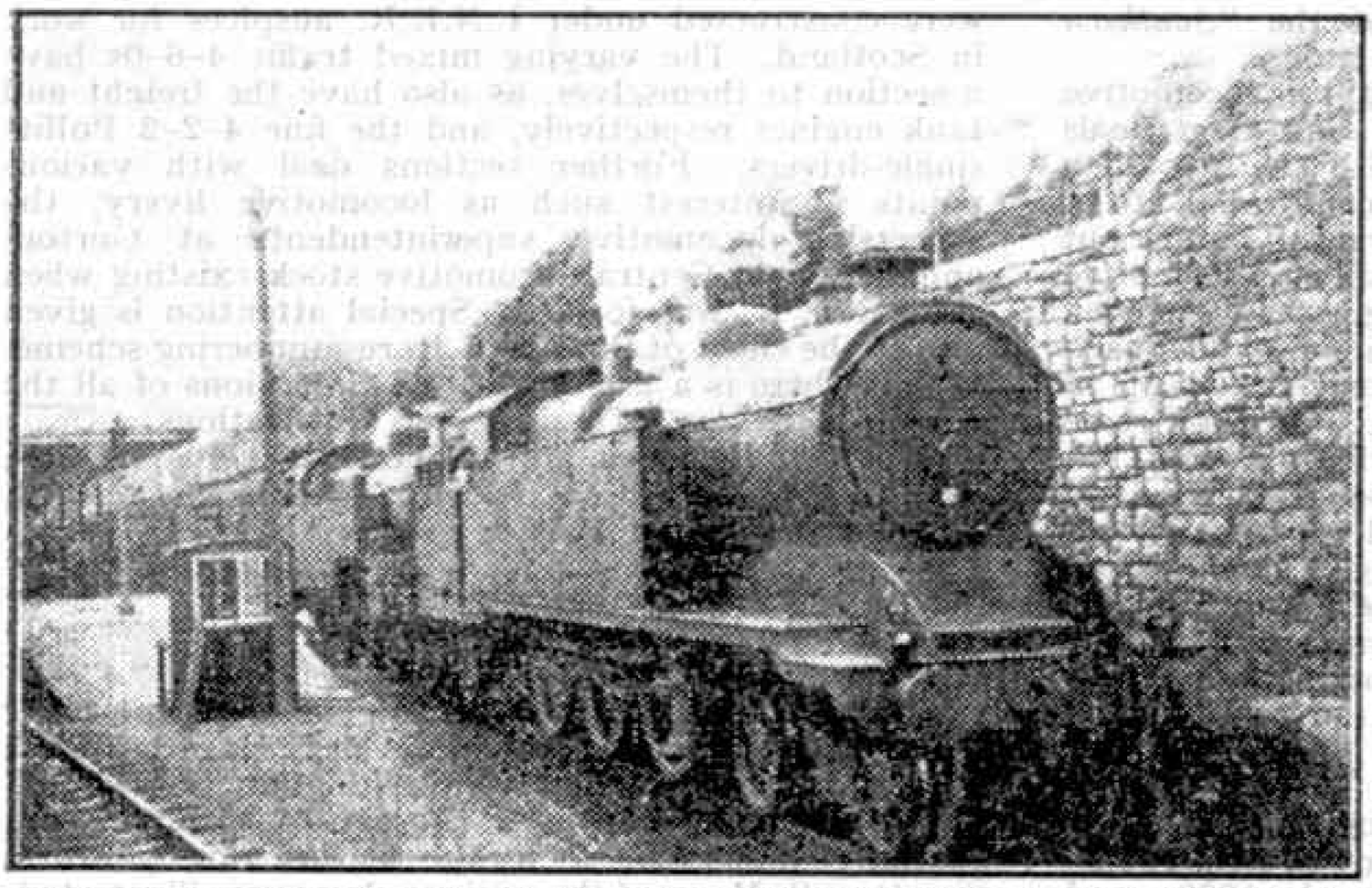
These "*Titans of the Track*" are second editions of the respective booklets dealing with the L.M.S. and the S.R. As compared with the earlier publications their scope is enlarged and the paper is improved, so that the numerous reproductions of fresh locomotive and train photographs are very good. In each case there is now a commentary by Mr. Cecil J. Allen.

Copies of the books are obtainable from A.B.C. Locomotive Books, Mail Order Department, 33, Knollys Road, Streatham, London S.W.16, price 2/2½ and 1/8½ post free respectively.

Railway Notes

How a "Sandringham" beat "Cheltenham Flyer" times on G.W.R.

L.N.E.R. engines, frequently of the "Sandringham" or "B17" 3-cyl. 4-6-0 type, for considerable periods prior to the outbreak of war in 1939 used to work through from Sheffield to Swindon daily, running over G.W.R. metals south of Banbury through Oxford—there is a week-end working of this kind now—and returning on weekdays with the through York coaches which left Swindon at 9.5 p.m. As far as Foxhall Junction, just before Didcot, this through train followed the course of the "*Cheltenham Flyer*," decidedly the fastest express on the G.W.R., which up to September 1939 covered the 77¼ almost level miles from Swindon to Paddington in 65 min. at an average of 71.3 m.p.h. start to stop, with a usual load of about 235 tons.



L.M.S. 4-6-4T No. 11100, of the former Furness Railway, piloting 2-6-4T No. 2362, at Ulverston. Photograph by W. Hardin Osborne.

On this run L.N.E.R. No. 2863 "*Everton*" had a slightly less load than usual one fine evening and the driver apparently thought he would just show the Great Western people what *his* engine could do. The start was from the bay at Swindon, with the engine out ahead of the platform end, and the acceleration was tremendous. In four miles speed was up to about 67 m.p.h. Shrivenham, 5¼ miles, was passed in 6¼ min. at 75, Uffington, 10¾ miles, in less than even time at 83, while on faintly falling grades between Challow and Steventon 7.4 miles were reeled off in 5 min. 5 sec., with a maximum of 88 and steady running at about 87 m.p.h. Thus the 20¼ miles to passing Steventon occupied only 17½ min., a min. less than the "*Cheltenham Flyer's*" schedule, and no less than 6½ min. less than the allowance for this particular train. In little more than 15 min. "*Everton*" had transformed a 4 min. late start into 2½ min. early running! Now it was time to brake severely for Foxhall Junction, and easy running followed from Didcot North to Oxford where the arrival would have been exactly to time but for a signal slowing.

"On my fastest '*Cheltenham Flyer*' trip," writes Mr. R. A. H. Weight, "behind a Castle with 230 tons, when the 77¼ miles to Paddington were covered in 62½ min., we took 18 min. 2 sec. to pass Steventon and reached our maximum speeds later in the run." On the occasion of the G.W.R. "record of records" run with 195 tons, when a 56¼ min. time was achieved from Swindon to London, and on one or two other occasions, a 17½ min. time to pass Steventon was slightly improved upon. The pre-war "*Bristolian*" also used to run very fast along that stretch.

Owing to having been designed to keep within weight and length limits necessary on the Great Eastern section, the L.N.E.R. "B17" locomotives are rather smaller than the G.W. "Castles" or some of the other modern British 4-6-0 express types. It is on Great Central duties, of which the turn to Swindon is one, that the "Sandringhams" have given their finest performances over a route with a high speed tradition, along which up to 1939 timings were very fast, as doubtless they will be again as soon as conditions permit. No. 2851 "*Derby County*" has been timed from Leicester to London with 330 tons over a stiffish road, 103 miles, in 106 min. actual, notwithstanding three p.w. slowings, so that the net time into Marylebone was only 102¼ min. The allowance was then 109 min., which timing has been kept by a "Sandringham" with 400 tons. Those engines have on several occasions touched 90/91 m.p.h., particularly when working that most difficult of pre-war G.C. expresses, the 2.32 a.m. newspaper train from Marylebone, which with never less than 300 tons in "Sandringham" days had to reach Leicester in 114 min., including two stops, and was expected to be there to the second. It usually was! Like other classes of engine, the "Sandringhams" often maintained mile a minute start-to-stop averages, or nearly so, on the very sharply timed, short 23¼ miles run between Leicester and Nottingham.

The big Gresley "Green Arrow" 2-6-2s now haul most of the principal trains to and from Marylebone, following a spell of "Pacifics."

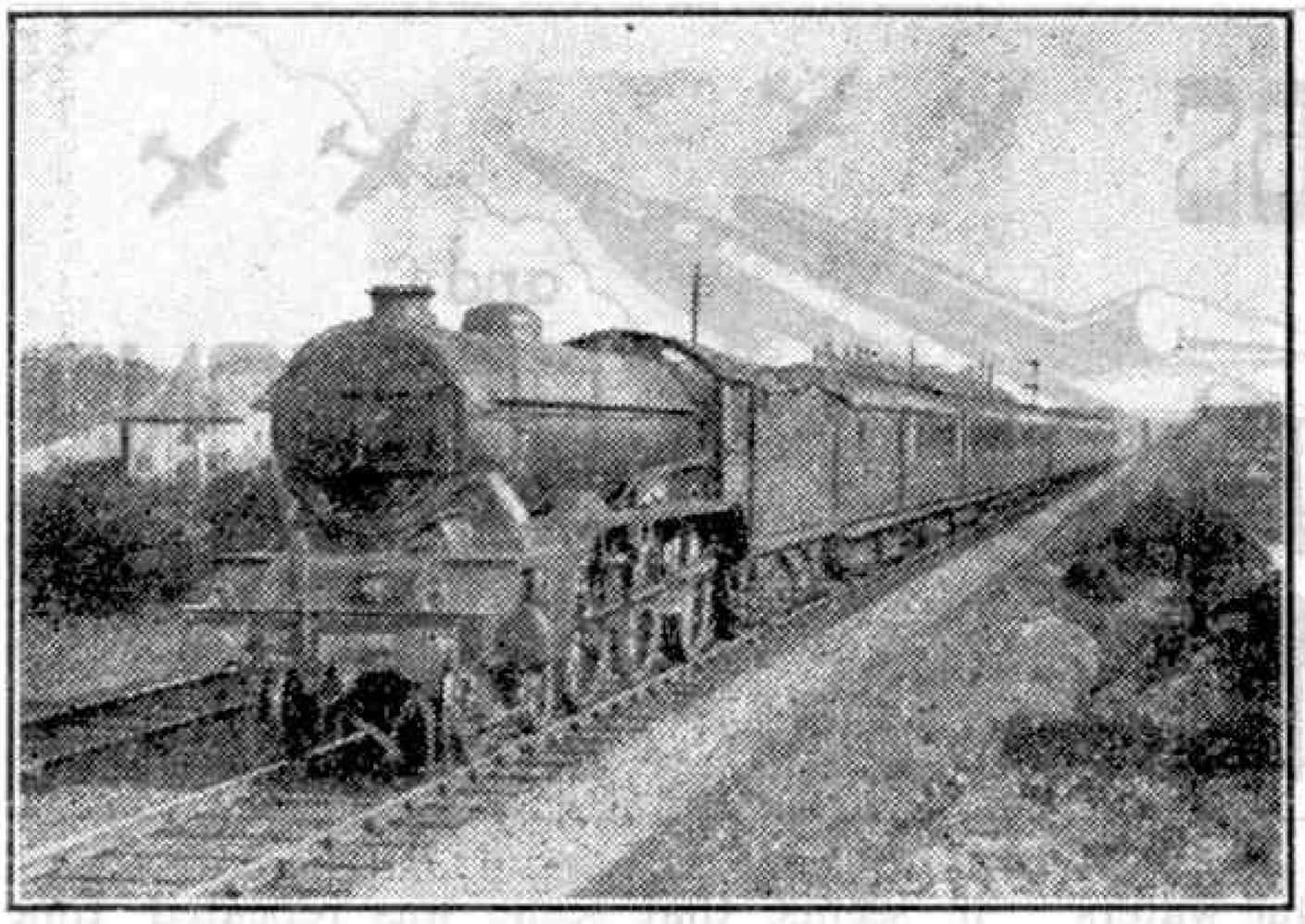
New Locomotives in New Zealand

We hear from our reader Mr. G. Ditchfield of Dunedin, South Island, N.Z., that 35 new class "J.A." mixed traffic locomotives are being constructed at the State Railway Works at Hillside, Dunedin, for general service on all South Island main lines as far north as Picton. Having eight driving wheels out of a total of 22 on engine and tender, we take it they are of the 4-8-2 type with an eight-wheeled tender, of large capacity, being designed to take a 300-ton load over the steeply graded Mikiwaka hill section. Some years ago we received details of various 4-6-2 types in use, including the "A.B." 4-6-2 and powerful booster equipped "K" class 4-8-4s. The new class now coming into service will be intermediate between those two as regards power rating.

G.W.R. Locomotive Notes

The 10 new "Castle" class 4-6-0s just placed in service have been observed working over many of the main line routes. The last of this batch, No. 7007 "*Ogmore Castle*," is stationed at Stafford Road, Wolverhampton. Nameplates have been affixed to 4-6-0 No. 1012 "*County of Denbigh*." Light 4-4-0s of the class built in 1936 to replace "Dukes" on the Cambrian and other routes, have had their numbers altered from 3200–14 to 9000–14. Among a number of shunting tank engines withdrawn is 0-4-0 No. 1341, formerly belonging to the Alexandra Docks and Railway Company, Newport, Mon.

The oil-fired "Hall" class 4-6-0 illustrated in our August issue, No. 5955 "*Garth Hall*," was at Old Oak Common shed, London, for inspection on 8th August, returning to Swindon on the 4.15 p.m. express from Paddington, attached in front of the train engine, which was "County" class No. 1011, of Bristol depot.



L.N.E.R. "B17" No. 2850 "Grimsby Town" on a Newcastle express near Bulwell Common, G.C. Section. Photograph by T. G. Hepburn.

Several instances are reported of South Wales expresses being worked by two "Castles" in the busy August holiday period, in order to balance the haulage of additional trains in one direction. "Star" class locomotives including No. 4018 "*Knight of the Grand Cross*," No. 4031 "*Queen Mary*" and No. 4057 "*Princess Elizabeth*," have been taking a considerable share in main line passenger running between Plymouth and Exeter during the summer season. Owing to heavy loads and severe gradients, pilot engine assistance is necessary to a considerable extent west of Newton Abbot, where the locomotive working is very interesting.

L.M.S. Tidings

The company have decided to name Nos. 6253-5, three modified standard "Princess Coronation" type 4-6-2 express locomotives now under construction at Crewe, as follows: "*City of St. Albans*," "*City of Stoke-on-Trent*," and "*City of Hereford*." New 4-6-0 class "5" mixed traffic engines have been placed in service and shedded in the following order: No. 4966, 16A, Nottingham; No. 4963-5, 19B, Millhouses, Sheffield; Nos. 4979-80, 27A, Polmadie, Glasgow; and No. 4981, 16A, Nottingham. Further class "4" 2-6-4Ts built at Derby have gone to Lancashire depots, No. 2233 to 26C, Bolton, No. 2234 to 26B, Agecroft, and No. 2235 to 23D, Wigan

Withdrawals of locomotives belonging to once famous express types include No. 755, Midland class "3" 4-4-0, and No. 14686 "*Urquhart Castle*," "3P" early Highland 4-6-0.

Railway Centenaries in Northern and Southern England

The first section of what was later to become the Furness Railway was completed 100 years ago. Until it was merged into the L.M.S. group in 1923 this railway served part of the Lake District, the important North Lancashire industrial area of Barrow-in-Furness and the Cumberland coastal region, as a separate company. One of its earliest Bury "Coppernob" 0-4-0 locomotives was preserved on exhibition outside Barrow Central Station for many years and probably will be returned there from Crewe soon.

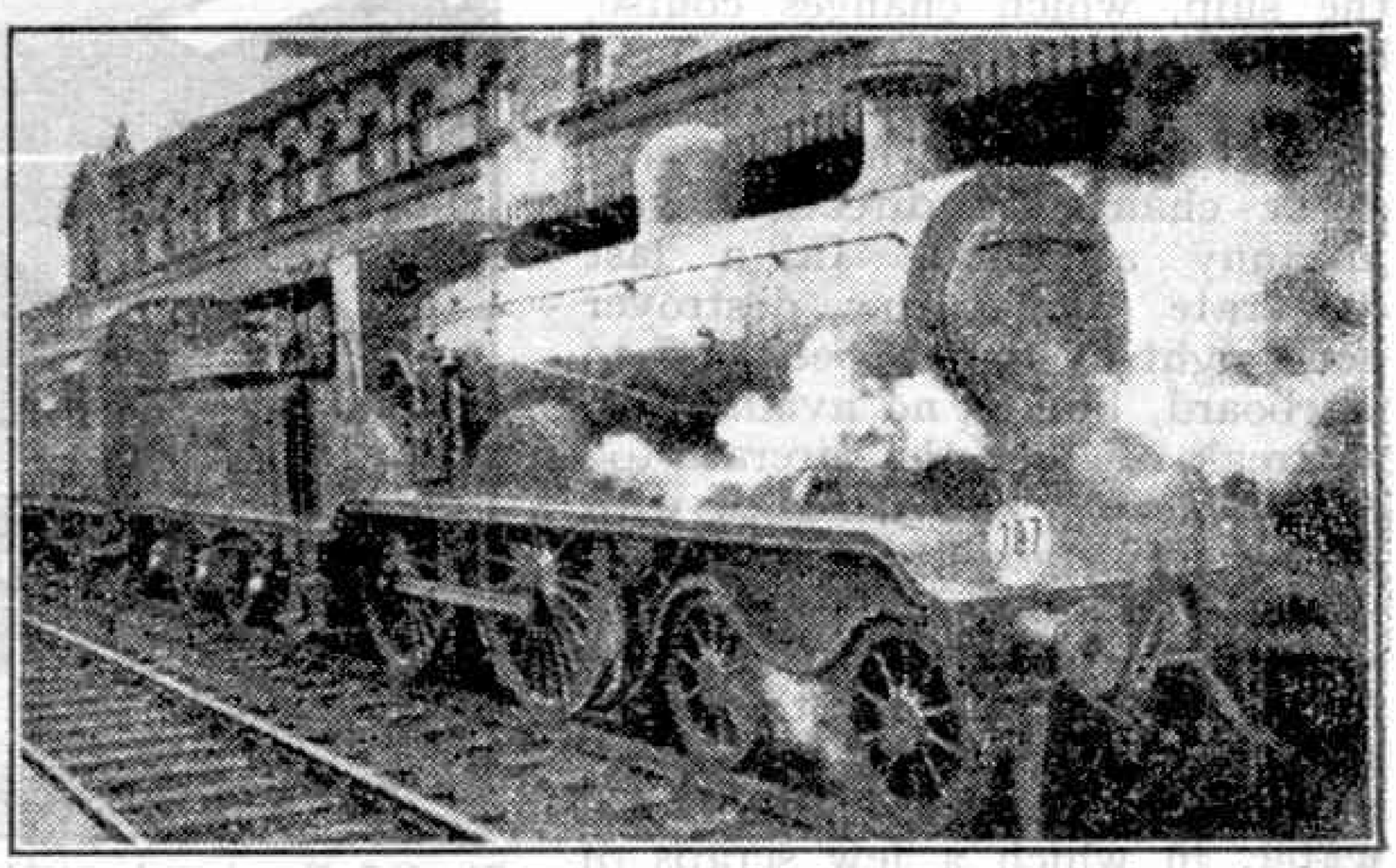
The last and biggest Furness type was the 4-6-4T design of 1920, a class of five imposing engines with inside cylinders, 19½ by 26 in., 5 ft. 8 in. driving wheels, 170 lb. per sq. in. boiler pressure and a tractive effort of 21,066 lb. Originally F.R. Nos. 115-9, they became L.M.S. Nos. 11100-4, one of which is illustrated working on a double-headed, heavy passenger train. They are now all withdrawn and nearly all the other one-time Indian red "Barrow" locomotives have disappeared. Furness coaches were blue and white.

The London, Brighton and South Coast system now forms the Central Division of the S.R. One hundred years ago the "Brighton" line, as it was generally known, had been completed along the south coast to Eastbourne and St. Leonards and was being extended westward in Sussex to Bognor, Arundel and Chichester, in addition to its main London-Brighton route. Other cross-country lines in Surrey and Sussex followed, as also, after many stormy altercations, the westward extension to a junction with the London and South Western near Portsmouth, where the town lines were jointly operated until Southern days. Many L.B.S.C. tender and tank engines are familiar to-day with 2,000 added to their former numbers, and we illustrate one of their best types of 4-4-0, the "B4" class, which did fine work on the fastest coast services 35-40 years ago. This class was replaced to a great extent later by "Atlantics" as well as large 4-6-2 and 4-6-4 express tanks. The last are now "N15x" 4-6-0 tender engines, and the two 4-6-2Ts, painted light green, are stationed at Tunbridge Wells West for Oxted line passenger working.

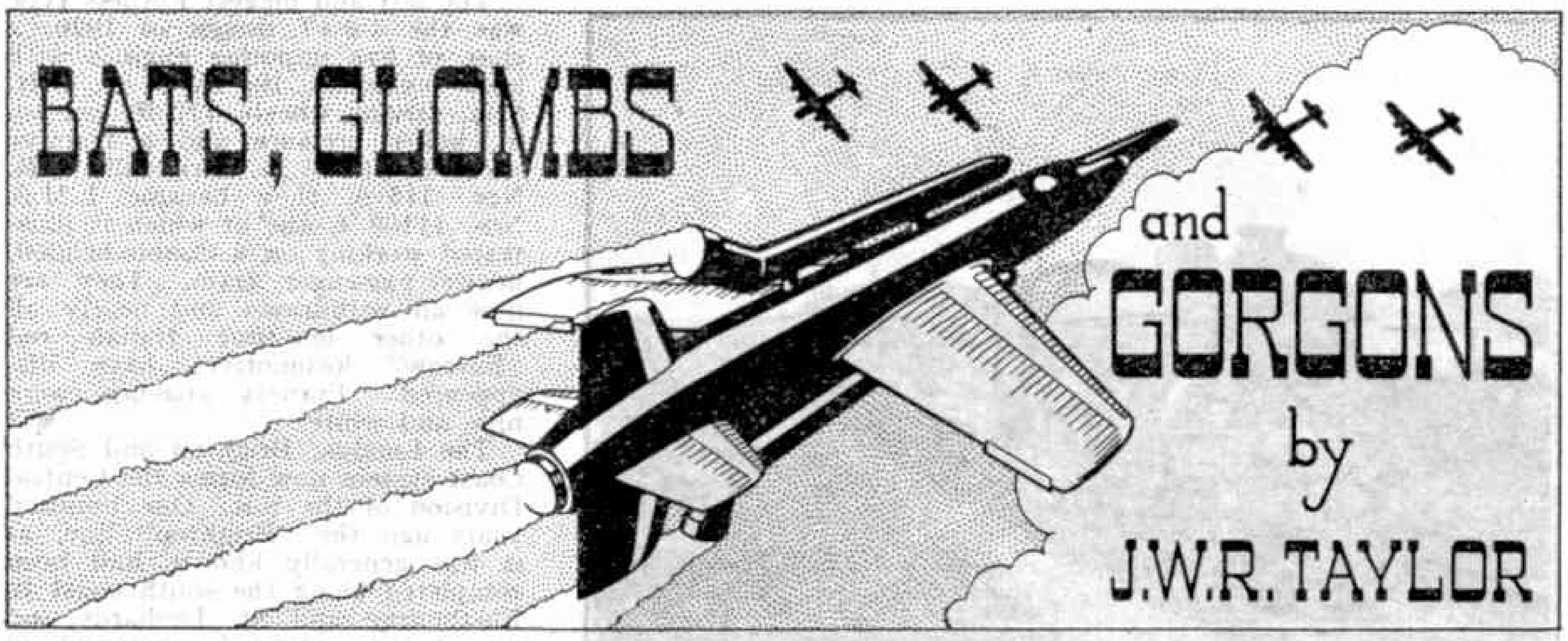
In Victorian days "Brighton" locomotives were named and painted yellow; the painting later became brown, then black or grey, many names disappeared, and some of the old-time embellishments in which Brighton craftsmen had taken great pride were painted over. Electric traction gradually spread its tentacles over much of the territory and the hearts of many "Brighton" locomotive enthusiasts became sadder.

* * * *

From the "*Santa Fe Magazine*" we learn that "*The Chief*," fastest and only daily all-first-class streamliner between Chicago and Los Angeles, previously steam-hauled, is now powered by a 5,400 h.p. Diesel-electric locomotive.



S. R. "B4" class 4-4-0, of the former L.B.S.C., at the head of a train from London Bridge at Tunbridge Wells in 1938. Photograph by A. C. M. Clements.

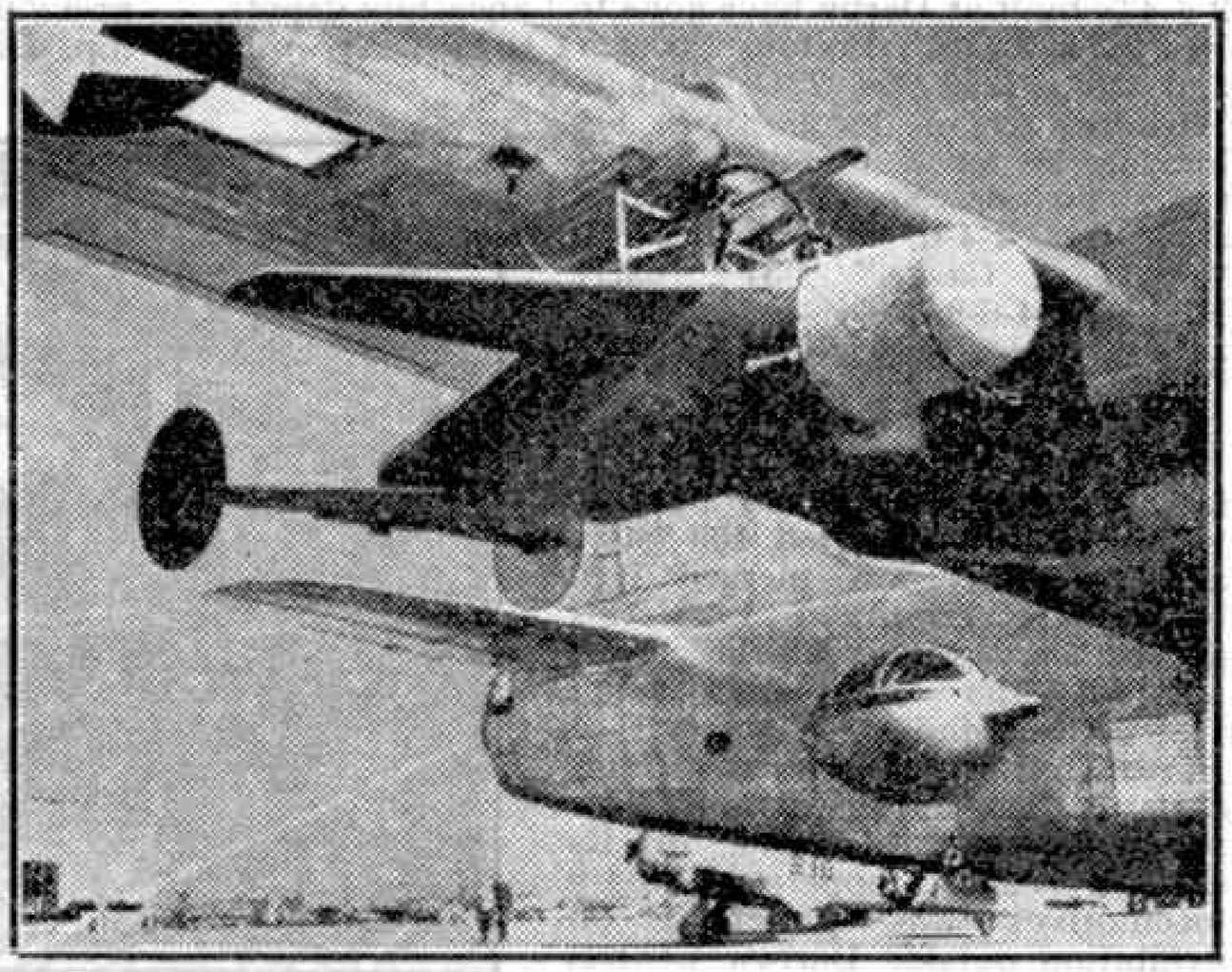


THE scene is set in the calm blue waters of the South Pacific; the time, the Spring of 1945. Overhead a lone Consolidated "Privateer" patrol bomber of the American Navy drones almost lazily through the incredibly blue skies. Suddenly the whole scene is changed—with a quick roar of power the "Privateer" banks steeply, revealing two objects like tiny aeroplanes slung beneath its wings, and then dives towards a blob that stands out dark and smoking on the horizon. As the blob grows larger it becomes recognisable as a destroyer and tiny pin-points of light wink from its decks, followed a few seconds later by puffs of smoke like cotton wool which spatter the sky round the "Privateer" with shrapnel.

The bomber turns gracefully and flies just out of range of the guns of the Japanese destroyer. Then there is a sudden flash and roar under its wing as one of the tiny aircraft shoots forward from its carrier towards the ship, which changes course, leaving a zig-zag wake startlingly white against the blue. But the aircraft races down, following every change in direction with uncanny accuracy. In a last desperate effort the destroyer heels right over and speeds off to starboard, but to no avail. Like a streak of light the aircraft too banks steeply and smashes with a shattering explosion into the side of the ship. Soon the "Privateer" turns away to resume its steady patrol and the scene is once more peaceful except for a widening patch of oil on the water, in which a few scraps of debris bob hopelessly.

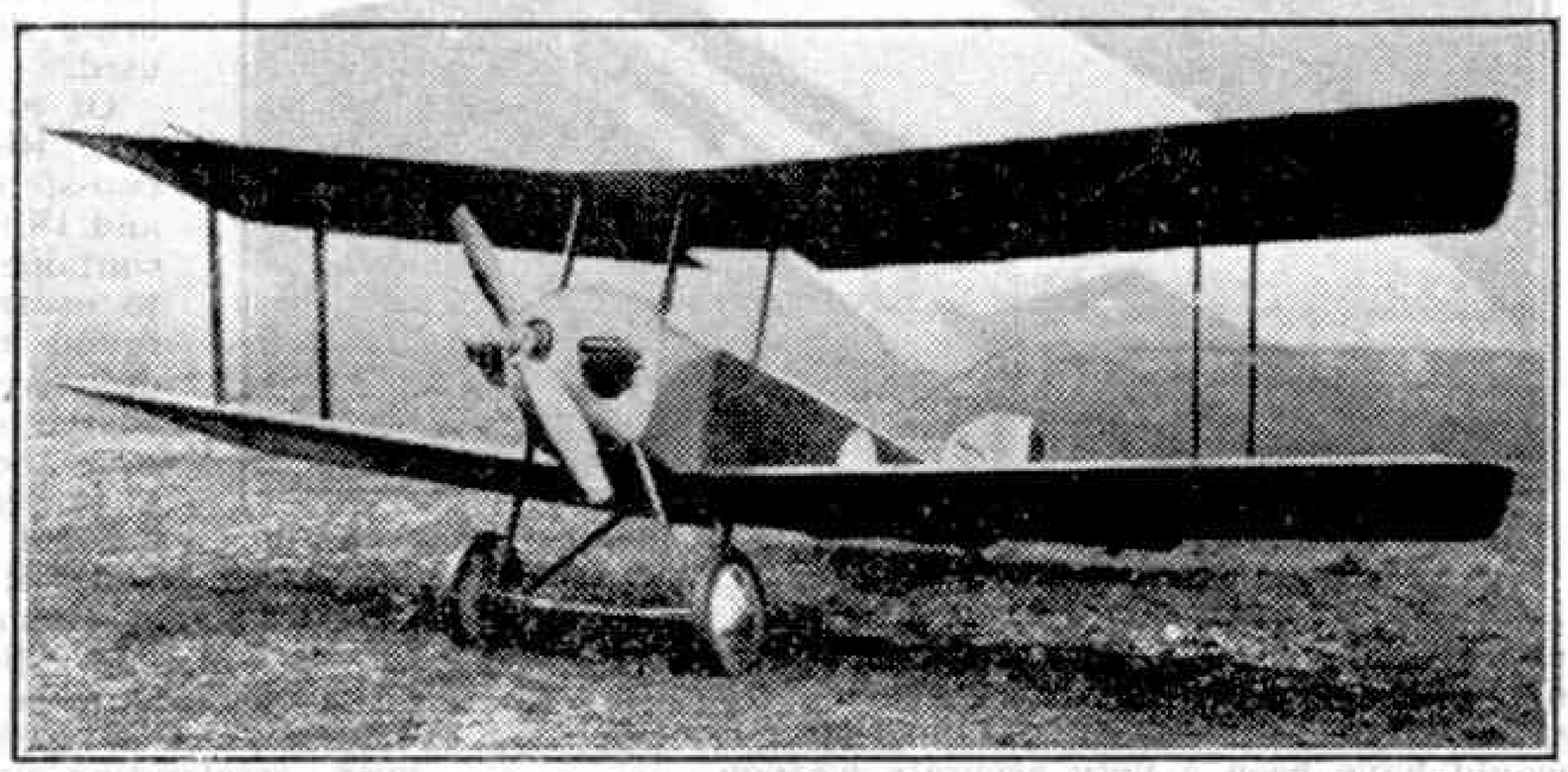
Uncanny and incredible though it seems, that scene was repeated time after time in the closing months of the war against Japan. The aircraft carried under the wings of the "Privateers" were known as "Bats," and were in reality just about the deadliest, most accurate aerial missiles devised by Allied scientists, until the atomic bomb came along. One of them is shown in the illustration on this page, a small rocket-propelled pilotless monoplane, 12 ft. long. It carries a radar self-directing scanner in its blunt nose, which, once it has detected the target, guides the missile unerringly towards it, following every evasive action without any need for outside radio control.

There have been many claims by Americans in recent years that their five pilotless explosive-carrying aircraft built at Bellport in 1918 were the world's first; but the little Sopwith "Sparrow" beat



The U.S. Navy's radar-guided "Bat" bomb slung under the wing of a "Privateer" patrol bomber. The machine carries one of these bombs under each wing.

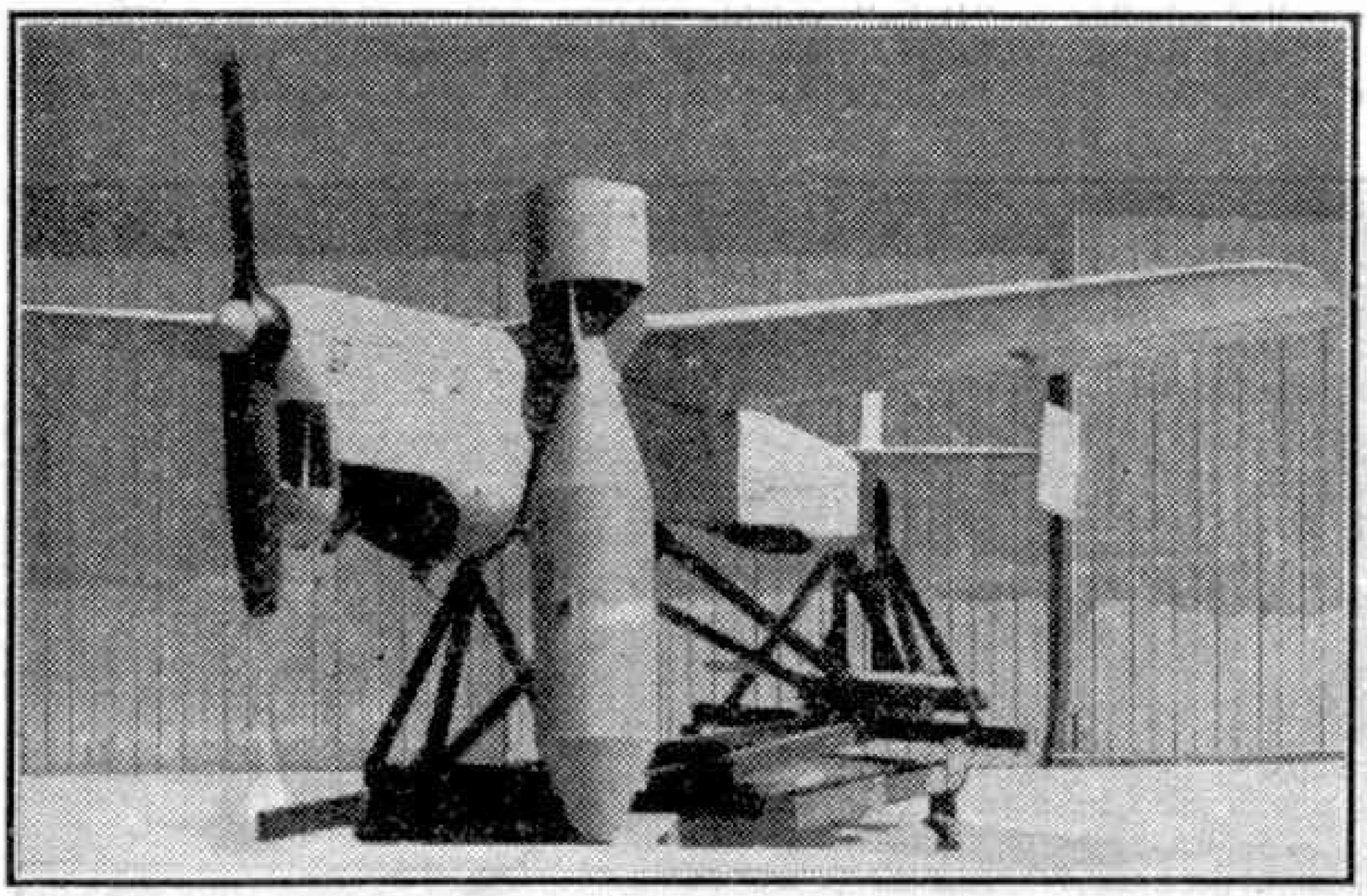
them by a year, and in fact this frail-looking biplane was the first of the weird experimental machines that have led up to the "Doodle-bugs," "Bats," "Gorgons," "Hooplas," and all the other missiles of to-day. At first glance it appears to be quite an ordinary little sporting biplane with a 30 h.p. A.B.C. "Gnat" engine. But it was too small to carry a pilot; instead it was flown by radio control, and the innocent-looking nose concealed 50 lb. of explosive. The radio control was rather primitive, however, and the "Sparrow's" only claim to fame is that during one demonstration it chased a lot of very important and very frightened foreign air attachés round a field, before crashing. Then came the five American machines which were tested out at Long Island, New York, and were intended to bomb Berlin in daylight from bases in France. But they too were not over-successful, and the end of the war ended much of the enthusiasm for such missiles.



Sopwith "Sparrow," of 1917. Photograph by courtesy of Hawker Aircraft Ltd.

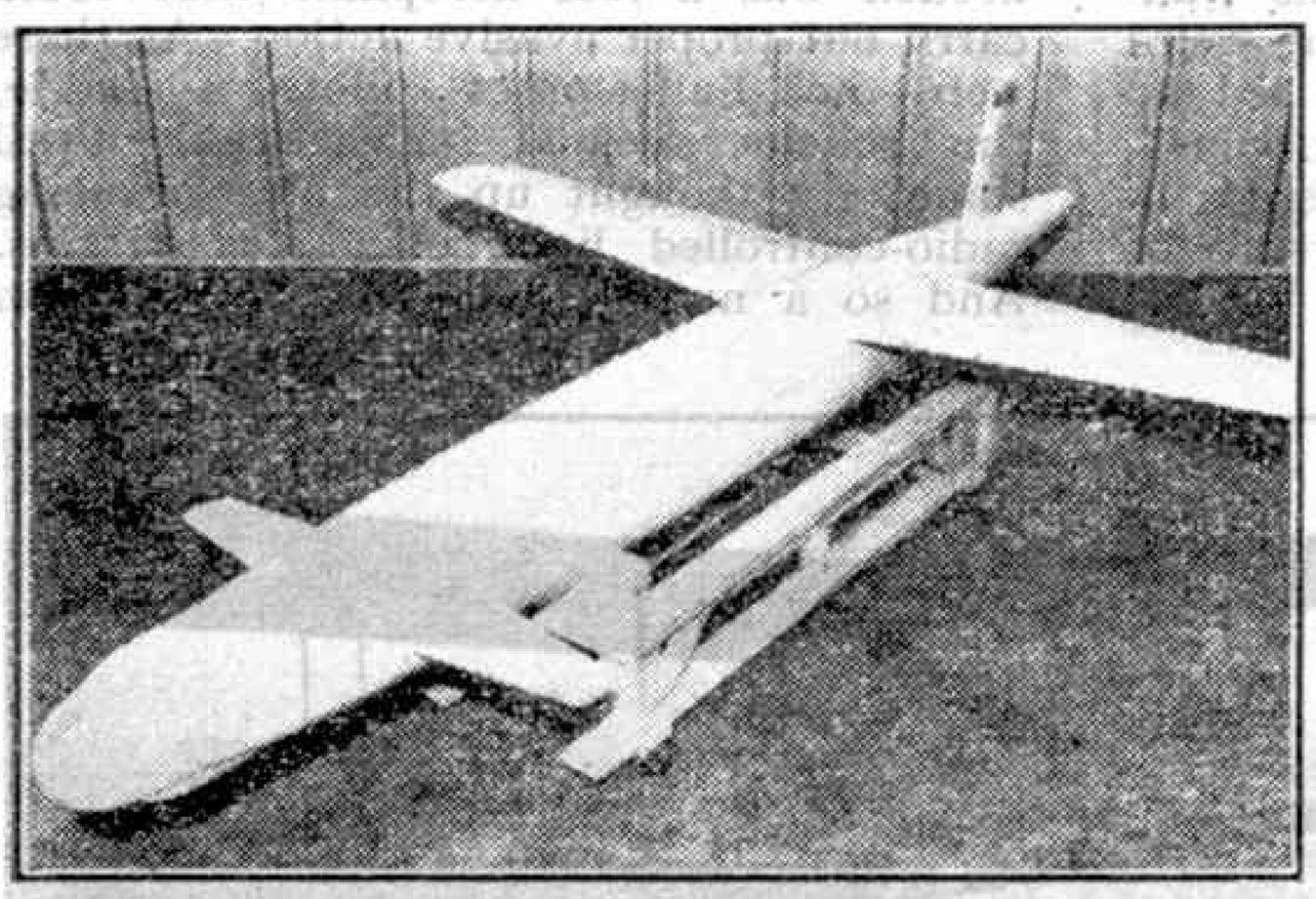
In the middle thirties the idea was revived for a different purpose. The anti-aircraft gunners of the Royal Navy were not noted for their accuracy in those days, which is not surprising as they got so little practice. Occasionally a pilot could be persuaded to tow a drogue target for them to shoot at—but what was needed was a real aeroplane that could carry out proper evasive action. As there were no bullet-proof pilots available, this scheme seemed impracticable until somebody thought up the idea of using radio-controlled light planes as targets. And so a number of "Tiger Moths" on floats were fitted out for the job, re-named "Queen Bees," and proved highly successful. Fortunately, or unfortunately, depending whether one was a tax-payer or a sailor, the shooting was still not good enough to make the cost of the scheme exorbitant.

The success of these "Queen Bees" set scientists and designers in Britain and Germany working again on more lethal designs, for the advantages of an aircraft that could deliver a load of explosive on an enemy town without risking the lives of pilots and crews were obvious. Little could be written about these amazing developments during the war as most were top secret, but had the war continued for another year there is no doubt that the Germans in particular would have had some most unpleasant weapons to use against us.



Miles "Hoopla." The underside of the fuselage is cut away to accommodate the 1,000 lb. bomb. Photograph by courtesy of Miles Aircraft Ltd.

The only British wartime pilotless aircraft of which details may yet be given is the Miles "Hoopla," although it is known that we had others under development more accurate and efficient than Hitler's V.1. The "Hoopla" was a little high-wing monoplane and was to have a cheap mass-produced engine. The undersurface of its fuselage was cut away to



The "Gorgon," a 16 ft. long aerial missile that carries a 100 lb. charge of explosive. Official U.S. Navy photograph.

accommodate a single 1,000 lb. bomb and it had a range of 400 miles. Further particulars may not be given even now, but Miles claim that the "Hoopla" would have been a very accurate weapon.

The first of all the radio-controlled missiles to be used in action was the German Henschel 293, a small rocket-propelled bomb first used against Allied shipping in the Bay of Biscay in the Autumn of 1942. Two were normally carried under the wings of a Dornier 217 bomber and were operated in much the same way as the later American "Bats," except that they were controlled through their "bomb-run" by a radio-operator in the parent bomber. It was this fact that eventually rendered the Hs. 293 ineffective, for, after many initial successes, it was discovered that the radio controls could be jammed, after which the bomb often went into a series of amazing aerobatics before ending up in the sea. There was at least one instance when the Hs. 293 was reported to have changed direction and chased after its parent bomber, much to the consternation of the German air-crew.

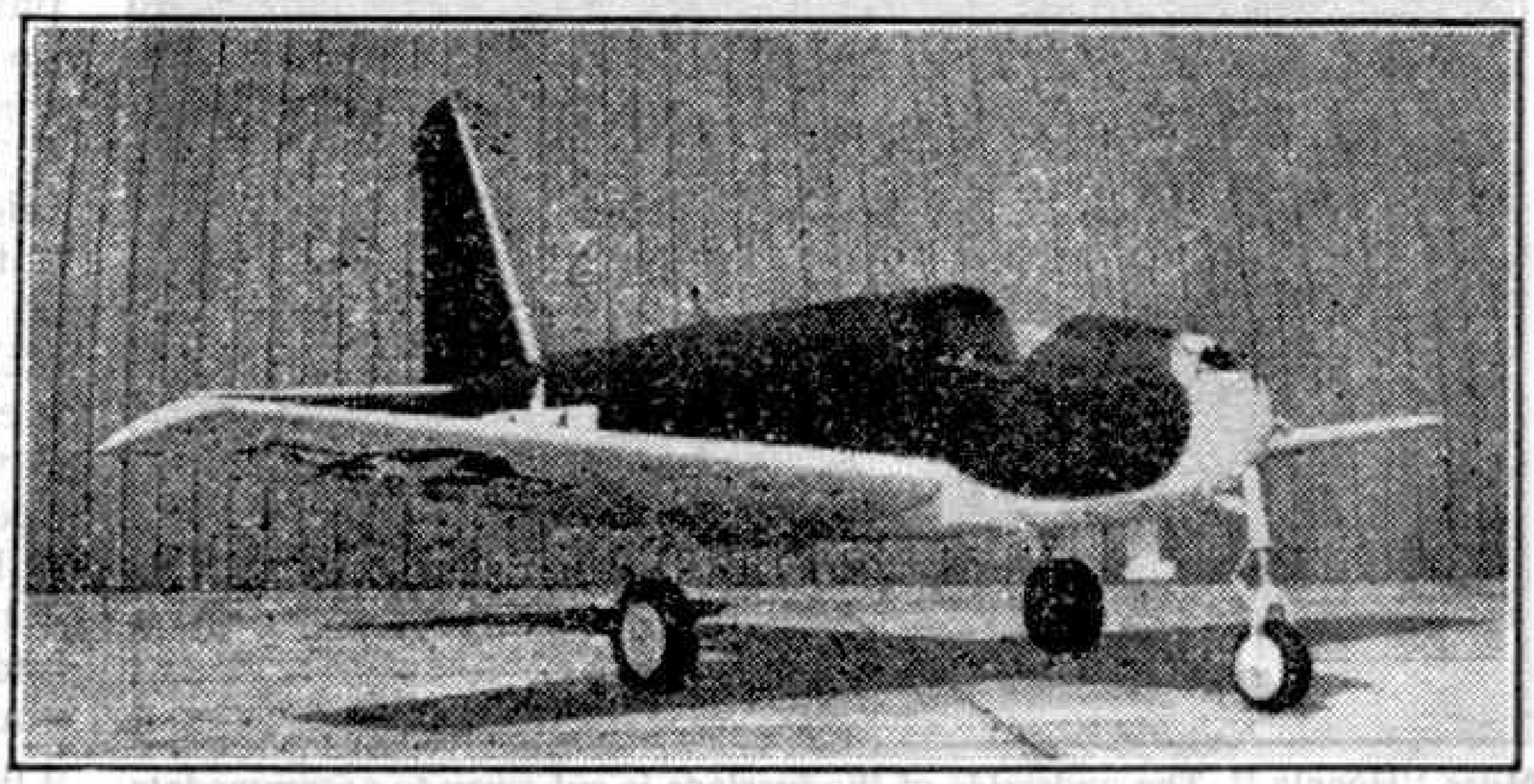
The Henschel 293 had a span of 9 ft. 6 in.—much the same as the "Bat"—and weighed 1,730 lb. of which 1,120 lb. was explosive. It had a single rocket motor, similar to the Walter 109-500 assisted take-off unit, which gave it a top speed of 375 m.p.h. and controlled range of 5½ miles.

Having had some initial success the Germans proceeded to go in for jet and rocket-propelled missiles in a big way. One result was the V.1 Flying Bomb, of which few readers will need to be reminded. It was a clumsy weapon, little more than an all-metal, cleaned-up, jet-propelled version of the British and American missiles of 27 years earlier, and it did not even have their radio control. But it did a lot of damage in a short time at no expense in airerews—although there was apparently little future in the job of launching them!

But later enemy developments were far more ingenious and the "Schmetterling" and "Rheintochter" in particular were very formidable weapons. The "Schmetterling" (V.3) was designed by Professor Wagner of Junkers and had a torpedo-like fuselage just over 13 ft. long, fitted with swept-back wings and a cruciform tail. It is shown in the title drawing of this article, and had an all-up weight of 970 lb. which included a 55 lb. warhead. Take-off was assisted by two jettisonable stove-pipe rocket units mounted above and below the fuselage, which gave the weapon a speed of 620 m.p.h. It was intended for use against Allied bombers, and its radio control was so effective that the Germans hoped eventually to bring down a bomber with every one used.

Of even more terrifying appearance, the "Rheintochter" R.1 was a massive two-step rocket, weighing nearly 1½ tons and 18 ft. 10 in. long. The front portion contained a proximity fuse, the motors to control the six fins which projected round this portion, gyroscopes, radio directive gear, rocket unit and the main charge of high explosive. Aft of this came the "booster" unit, which contained a powerful dry-fuel rocket unit and boasted a further four control fins. The "Rheintochter" was intended to be launched from an inclined ramp, the second-stage "booster" being used for initial propulsion. As soon as it was used up it was automatically jettisoned and the front rocket units took over, accelerating up to 1,000 m.p.h. This rocket was at first intended to be controlled by two radar "plots," one on the bomber and the other on the rocket, but the enemy were working also on a device similar to that fitted to the "Bat," which would enable the "Rheintochter" to chase along on its own towards a formation of bombers and, when it got near enough, blow itself up with, it was hoped, three or four bombers, by means of a proximity fuse. Fortunately the "Schmetterling" and "Rheintochter" and the "Wasserfall," "Eizian," "X.4," and all the other new German war rockets were not ready in time to be used in action; but at least one other American radio-controlled rocket besides the "Bat" was used to good effect in the Pacific, and several more were under development. These weapons were mostly designed by the Naval Aircraft Modification Unit's Pilotless a/c Division, and, while the Germans were well ahead in the applications of rocket propulsion, the Americans had an equally clear lead in radio-control and target-seeking.

One of these American rockets was "Little Joe," a rather ugly missile, which looked like a length of drain-pipe with four small fins at one end and four big ones at the other end. It was intended for either air-to-air or surface vessel-to-air use against Japanese "Baka" suicide planes and proved very effective. Later types such as the "Gorgon," "Gargoyle" and "Glomb" were much more (*Continued on page 436*)



Another American pilotless aircraft, the "Glomb" or Glider-Bomb. Official U.S. Navy photograph.

Road, rail and waterways side by side in Derbyshire. The Cromford Canal is on the right of the illustration.

Cromford Canal

By Frank Rodgers

TO railway enthusiasts the names Jessop and Outram will always be connected with early railways, and with the part played by these two pioneers in the construction of the permanent way. It may not be known generally, however, that these engineers also constructed a canal. They were well qualified for this task, for it involved the building of aqueducts and tunnels, and incurred many of the hazards experienced in early railway construction.

The Cromford Canal was opened in 1793, and although only 15 miles in length it has played a very important part in the transport system of the country. Beginning at Cromford, near Matlock, in Derbyshire, the canal follows the lovely wooded valley of the Derwent down to Ambergate, where it follows the River Amber for several miles before passing through the hillside into the Erewash Valley on the Nottinghamshire border. Cutting it through the hilly countryside was a great engineering feat.

Jessop and Outram were following in the footsteps of James Brindley, the illiterate Derbyshire canal genius who had died in 1772. He believed that rivers and lakes were there solely as canal feeders, but even he would have been surprised by the use of the drainage water from lead mines, which was the source of supply for Jessop and Outram's canal!

Cromford Canal has its birth at Cromford, among romantic scenery of rocks and woods. Here in 1771 Richard Arkwright built the first cotton mill in England, utilising a drain or "sough" as his water supply. This sough was two miles long, cutting through the hills to Wirksworth and draining the many lead mines of this district. As it was of a uniformly warm temperature this water seldom froze, and was therefore used for the new venture. Cromford Canal was thus in the probably unique position of being navigable when the rest of the canal system was icebound.

Almost opposite Arkwright's mill a cliff overhangs the road, a narrow strip of water at its base. In a few yards the cliff ends abruptly, the strip of water turns at right angles to the road, and lo! a canal, complete with wharf. To-day the source of water supply is augmented by the stream from the Via Gellia, the famous valley which here joins the Derwent Valley.

Cromford Wharf was a hive of industry in its heyday. Wagons unloaded Derbyshire cheeses brought down from the farms for despatch all over the world, and coal, iron and lead were also sent from here. Hundreds of lead mine shafts still dot the hillsides, proving how rich the country was in this mineral, and several pigs of lead with Roman inscriptions testify to Roman workings in the Cromford district. The well-known Hopton Wood stone, a marble quarried at Hopton a few miles away, was shipped from here. It has been used in many famous buildings, including Liverpool Cathedral, and a panel by Eric Gill is set in the Palace of the League of Nations at Geneva. Hopton Wood stone is better known, however, as the medium used by Jacob Epstein for his controversial sculptures.

Fine stone of the Millstone Grit variety, great quantities of which were also despatched, is quarried in the Stancliffe quarries at Darley Dale. Loudoners pass this stone every day on Hyde Park Corner and the Embankment and many other places. No doubt the whole population of Cromford, Matlock and neighbouring villages turned out when the stone for St. George's Hall at Liverpool was being loaded on to the canal barges. This included the huge lions, fashioned in the quarry, that guard the approach to the Hall. Thus the mineral wealth of Derbyshire was exported, and with the import traffic came timber, malt, groceries and other essentials.

From Cromford to Ambergate the canal has river, road, and rail for company, and perhaps nowhere else in England do the four methods of transport run so close together. At the place where the accompanying photograph was taken they are at their closest, rising one above the other on a high wall with the canal at the top; and thus the road or rail traveller sees nothing of Cromford Canal. The four systems cross several times and the cutting of the canal necessitated the construction of two aqueducts, over the Rivers Derwent and Amber respectively, at a cost of £6,000. When the railway was laid in later years a further aqueduct was built, as the line passes beneath the canal at one point.

Several tunnels for the canal were cut, and one which cuts through into the Erewash from the Amber Valley is nearly 3,000 yards long, costing £7 per yard. No towpath was provided, the tunnel being only eight feet high, and in those days of horsepower it was therefore necessary to propel the barge by "walking" the roof. This was done by the bargee lying on his back on the barge and going through the action of walking on the roof.

Ship Repair and Salvage—I

By Denis Rebbeck, M.A., B.Litt., M.Inst.N.A., M.I.Mar.E.

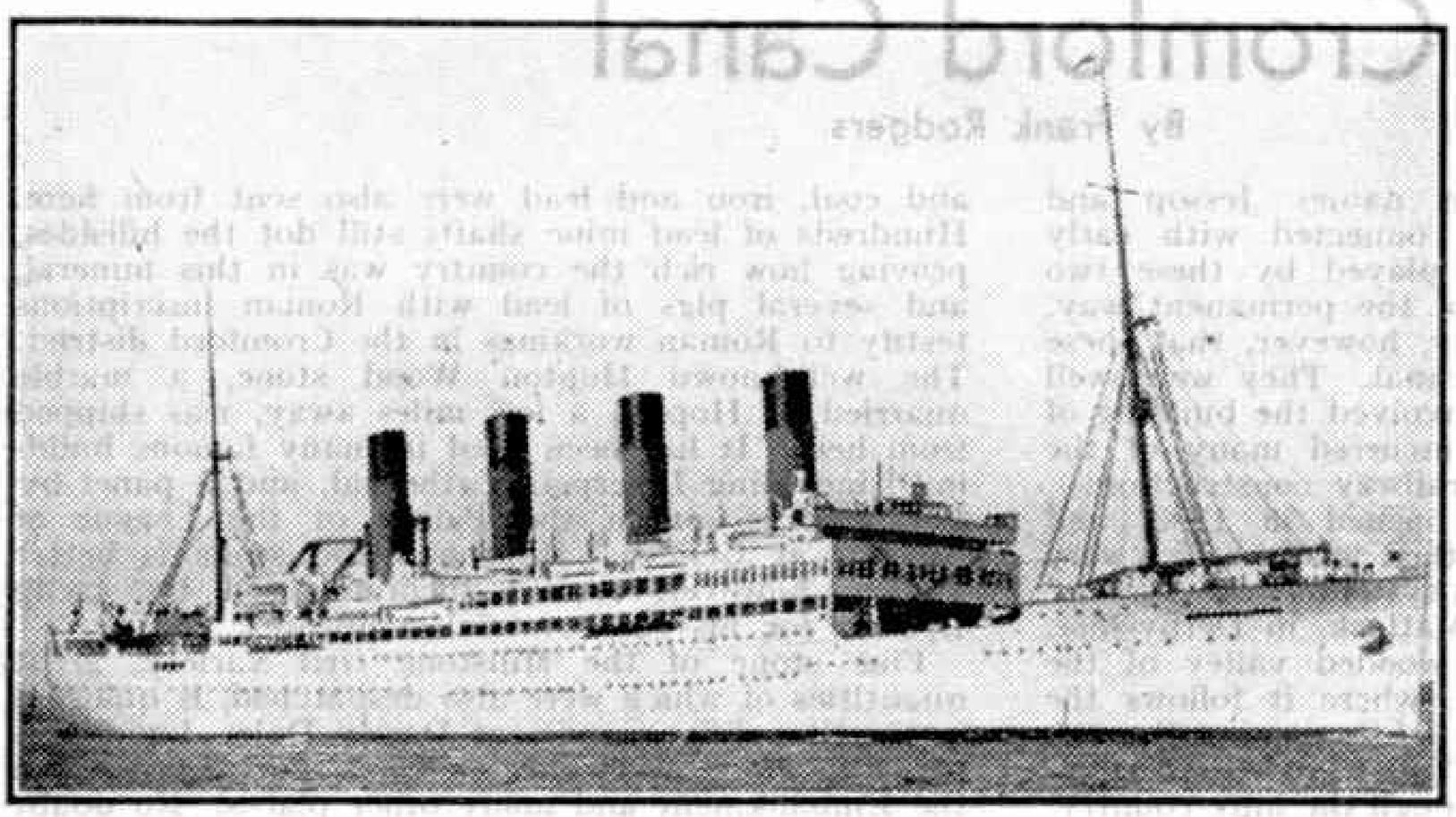
A NATION which possesses a large mercantile marine must have, in addition to adequate shipbuilding resources, extensive repair facilities, and Great Britain is fortunate in having both these industries. The importance of repair yards in wartime need hardly be stressed, and during the last two great conflicts the Allies would have found difficulty in keeping to the seas if they had not been able to make full use of the enormous potential of the repair yards in the British Isles.

It is not in shipbuilding but in ship repairing that the genius of those responsible is fully shown. Some of the achievements which have been wrought in this way are scarcely less remarkable than the work of building a ship from the very beginning. It would be impossible in the space at our disposal to record all the historic occasions when the shipbuilder's art has been thus manifested, but the author will attempt to outline the general details and to describe some of the more interesting examples.

One of the earliest examples of "ship surgery" occurred in the year 1813 when William Stephen, forebear of the famous Linthouse shipbuilding firm, lengthened the sailing ship *"Oscar."* This vessel was hauled up a slip and lengthened by being cut in two and having a new 16 ft. long portion build amidships. The shipbuilders of the time had declared that such a feat would be impossible, but William Stephen carried out the work successfully and confounded the critics. The *"Oscar,"* unfortunately, came to an untimely end, for on leaving the harbour after her "operation" she went ashore on Girdleness and was lost with almost all hands.

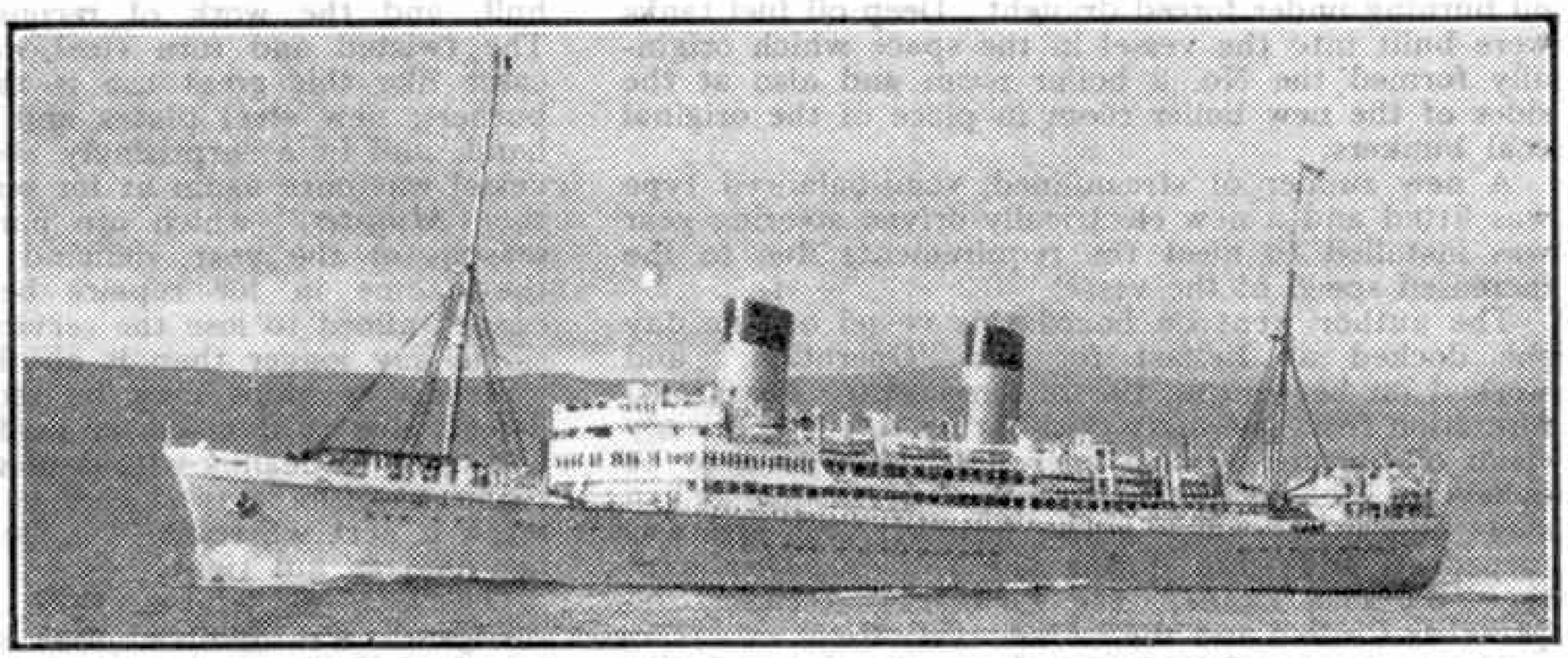
As time went on further experience was gained in the salvaging and repairing of ships, and the early part of the 20th century witnessed the opening of a new chapter in ship repair work generally and "ship surgery" in particular.

In 1901 the *"Port Morant,"* of 2,830 tons, while still on the stocks at Linthouse, was lengthened by 30 ft. The hull was cut through about amidships, forward of the engine and boiler space so as to necessitate no alterations in the machinery. One half of the ship was then moved by tackles along greased ways, similar to launching ways, for the required distance. The extra structure was then built in, and joined the separated portions into one complete ship. Although this operation may be quite simple to describe, it demanded great skill and careful planning to ensure a successful outcome, especially as the separated portions had to remain in line throughout their short journey. The extra strength necessary for a longer vessel entailed the addition and riveting of considerably more steel than that required for the new midships section.



The Union Castle liner "Windsor Castle" before reconditioning.

It must not be forgotten that this work was carried out at a time when the facilities for such operations were still very limited. When two further ships, the *"Miltiades"* and the *"Marathon,"* were each lengthened at Linthouse, by 50 ft. in 1912, the method of cutting steel plates by burning was not in existence. The weight which had to be moved in the case of each of these two vessels amounted to about 2,500 tons, and it was no easy task to move this great weight and place it in a new position without deviating a hair's breadth!

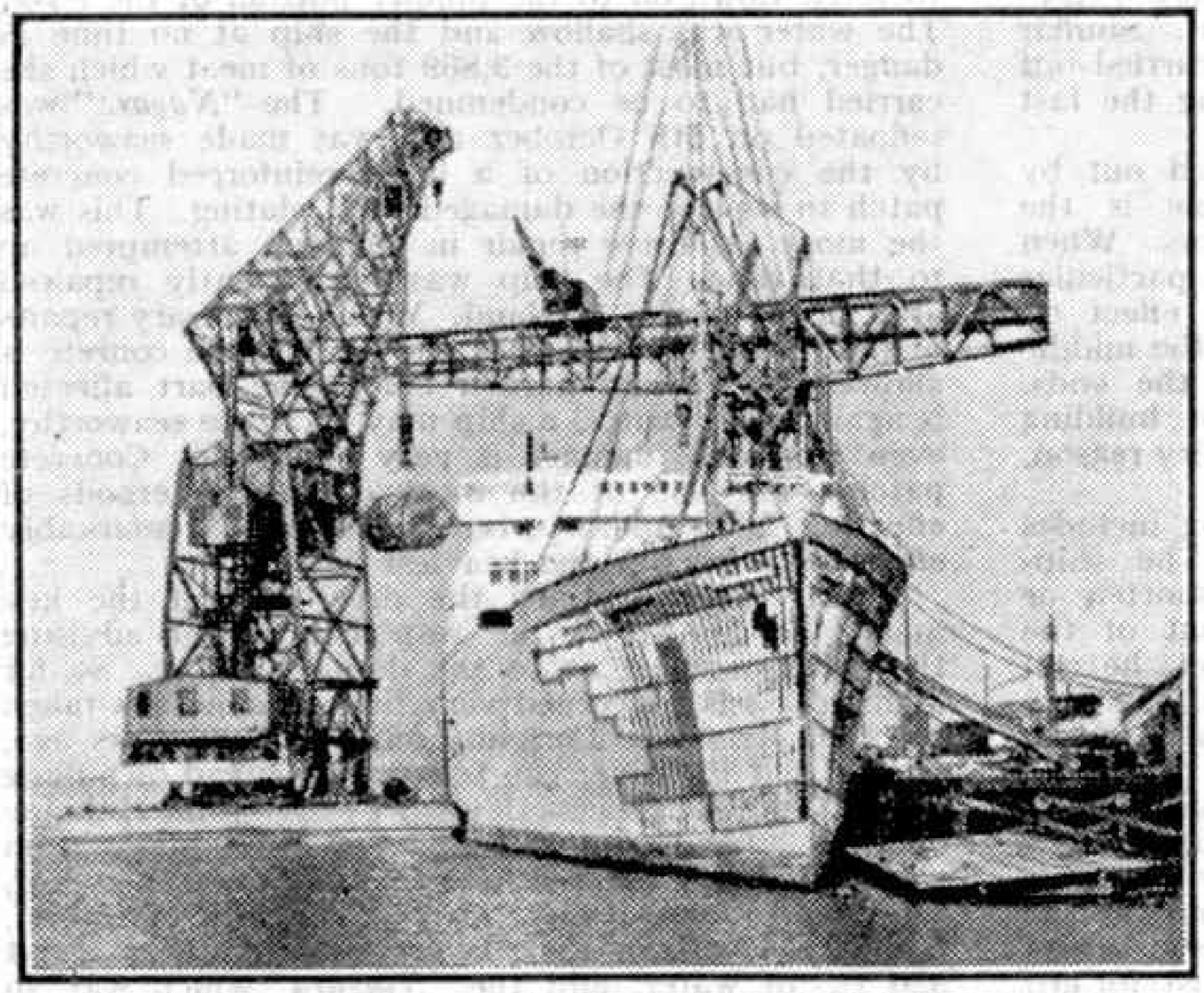


The "Windsor Castle" converted into a modern two-funnelled luxury liner.

Another famous case in the early years of this century was the salvage of the P. and O. liner *"China"* after she had been on the rocks at Perim for several months. The damage was so serious that Harland and Wolff Ltd. had to reconstruct her entire bottom, and the docking of this ship for repairs was reckoned to be a notable feat of engineering. The American liner *"Philadelphia"* caused consternation in her day by getting so far off her course whilst proceeding down channel that she ran on to the dreaded Manacles, south of Falmouth. Eventually she was got off, but her damage was very great and she had to be taken round to Belfast where she was practically rebuilt and fitted with entirely new engines and boilers and an improved stern.

The famous South African liner *"Scot,"* which had a marvellous career for record breaking and was owned by the old Union Line, was taken to Belfast, placed in dock, cut in two and lengthened by having over 50 ft. built into her midship body. A similar feat was performed at Belfast on the Hamburg-America liner *"Auguste Victoria."*

The most extensive reconditioning and re-engining programme of a fleet of passenger and mail vessels ever undertaken by any one company was carried out at Belfast by Harland and Wolff Ltd. for the Union-Castle Line. This programme was commenced in 1934 and completed five years later, and was carried out in conjunction with a vast shipbuilding programme for the same owners. The vessels which were reconditioned were the three motor liners *"Carnarvon Castle,"* *"Warwick Castle,"* and *"Winchester Castle,"* the two large liners *"Windsor Castle"* and *"Arundel Castle,"* and the three intermediate "L" class liners *"Llandaff Castle,"* *"Llandovery Castle"* and *"Llanstephan Castle."* The three motor liners had more powerful diesel engines fitted in the existing engine rooms and had their bows lengthened by some 15 ft., the two large liners had new boilers and turbines fitted and their bows also lengthened, while the three "L" class vessels were converted from coal to oil fuel.



The "ship surgery" to the "Windsor Castle" in progress.

Our illustrations shows the *"Windsor Castle"* before and after the "ship surgery" was carried out. It will be seen that the stately old four-funnelled steamer has been converted into a modern business-like luxury liner with two streamlined funnels. The bow has been lengthened by about 15 ft. on the water line and gracefully raked; the original geared turbines and single-ended coal-burning Scotch boilers with natural draught were replaced with more powerful propelling machinery, consisting of Parsons' triple-expansion, single-reduction, geared turbines with four Babcock Johnson water-tube boilers. Two of the old single-ended boilers were

retained for auxiliary purposes and converted to oil burning under forced draught. Deep oil fuel tanks were built into the vessel in the space which originally formed the No. 2 boiler room and also at the sides of the new boiler room in place of the original coal bunkers.

A new rudder of streamlined, semi-balanced type was fitted and a new electrically-driven steering gear was installed to meet the requirements due to the increased speed of the vessel.

The author went on board this vessel on the day she docked at Belfast for her "Operation," and worked on her during the re-conversion. The transformation from the dirty coal-burner to the spotlessly clean oil-burning luxury liner had to be seen to be believed. The vessel was destined to enjoy but a short life in her new guise, however, for she was torpedoed and sunk during the war, together with the "*Warwick Castle*," the "*Dunvegan Castle*," the "*Dunbar Castle*" and the "*Llandaff Castle*."

There are occasions when the parts of two badly damaged vessels are used in the reconstruction of one complete new hull, and there are ships sailing the seas which consist of say, the bow and forepart of one vessel and the midships and afterbody of another. Just such a case occurred recently in Sweden when two destroyers were badly damaged in an explosion in Harsfjärden, near Stockholm, in September 1941. A thorough examination of the 900-ton destroyer "*Klas Horn*," after she had been raised, showed that only the forward part of the hull was repairable. The hull of her sister ship "*Klas Uggla*" was beyond repair, but the machinery was in good condition and fit for further use. The Swedish Admiralty therefore decided to rebuild the hull of the "*Klas Horn*" and to make use of the "*Klas Uggla's*" machinery for the reconstructed hull of the "*Klas Horn*." The forward part of the last-named vessel was therefore towed to the Finnboda Yard, Stockholm, for repair, whilst a new after part was being built at the Malmö shipyard, where the two sections were subsequently dry-docked and joined together. The machinery of the "*Klas Uggla*" was then installed and the ship fitted out. Similar repairs and reconversion work have been carried out for the Royal Navy in this country during the last two world wars.

One of the most interesting jobs carried out by the ship-repair industry during peacetime is the rebuilding of the tank portion of oil tankers. When oil tankers carry cargoes of light oil, and in particular gasoline, the spirit has a very corrosive effect on the steel hull of the vessel, and as a result the middle part of the tanker is worn out before the ends. Some ship-repairers make a speciality of building new centre portions for tankers for this very reason, and then joining on the old ends.

It will be appreciated that ship-repairing includes re-building as well as "patching-up." The ship-repairer is a true genius, for he can shorten or lengthen a ship, he can take a piece out of the middle and join the ends together—in fact, he can do almost anything that is required of him.

One of the most frequent repair jobs in a shipyard, apart from the usual maintenance work, is dealing with collision damage. A typical example of this kind of damage was caused by a ship colliding with the cross-channel motor-vessel "*Munster*." This vessel was run into by a cargo boat when on the Liverpool-Dublin route in 1938, and very severe damage was inflicted on the "*Munster*" just for'ard of the bridge. The vessel was drydocked, timber staging was built around the damaged part of the hull, and the work of reconstruction commenced. The twisted and torn steel was cut away, and in cases like this great use is made of oxy-acetylene burners; new steel plates and sections were put in hand, and in a surprisingly short space of time the vessel was once again fit for service. Vessels such as the "*Munster*," which are particularly busy at all seasons of the year, demand a high priority when they come in for repairs because the shipowner cannot afford to lose the services of such craft for a single day longer than is absolutely necessary.

Repair to ships may be required on account of defects due to damage, or neglect, or ordinary wear and tear. In dealing with damage repairs a temporary repair is often carried out to enable the vessel to reach a port where she can be drydocked and have her damage put right.

On 28th September 1927, the meat transport "*Nagara*" was involved in a collision with the s.s. "*Crofton Hall*" in the River Plate. The "*Nagara*" was badly holed and the inrush of water caused her to settle down on to the muddy bottom of the river. The water was shallow and the ship at no time in danger, but most of the 3,869 tons of meat which she carried had to be condemned. The "*Nagara*" was refloated on 5th October and was made seaworthy by the construction of a large reinforced concrete patch to replace the damaged shell plating. This was the most extensive repair in concrete attempted up to that time. The ship was permanently repaired after her return to England. When temporary repairs of this nature can be effected, so that the conrete is allowed to set and harden before the part affected is again under water, a ship may be made seaworthy, even when the damage is very extensive. Concrete patches are one of the most common methods of effecting a temporary repair and are remarkably effective in all but the heaviest weather.

Bomb damage!

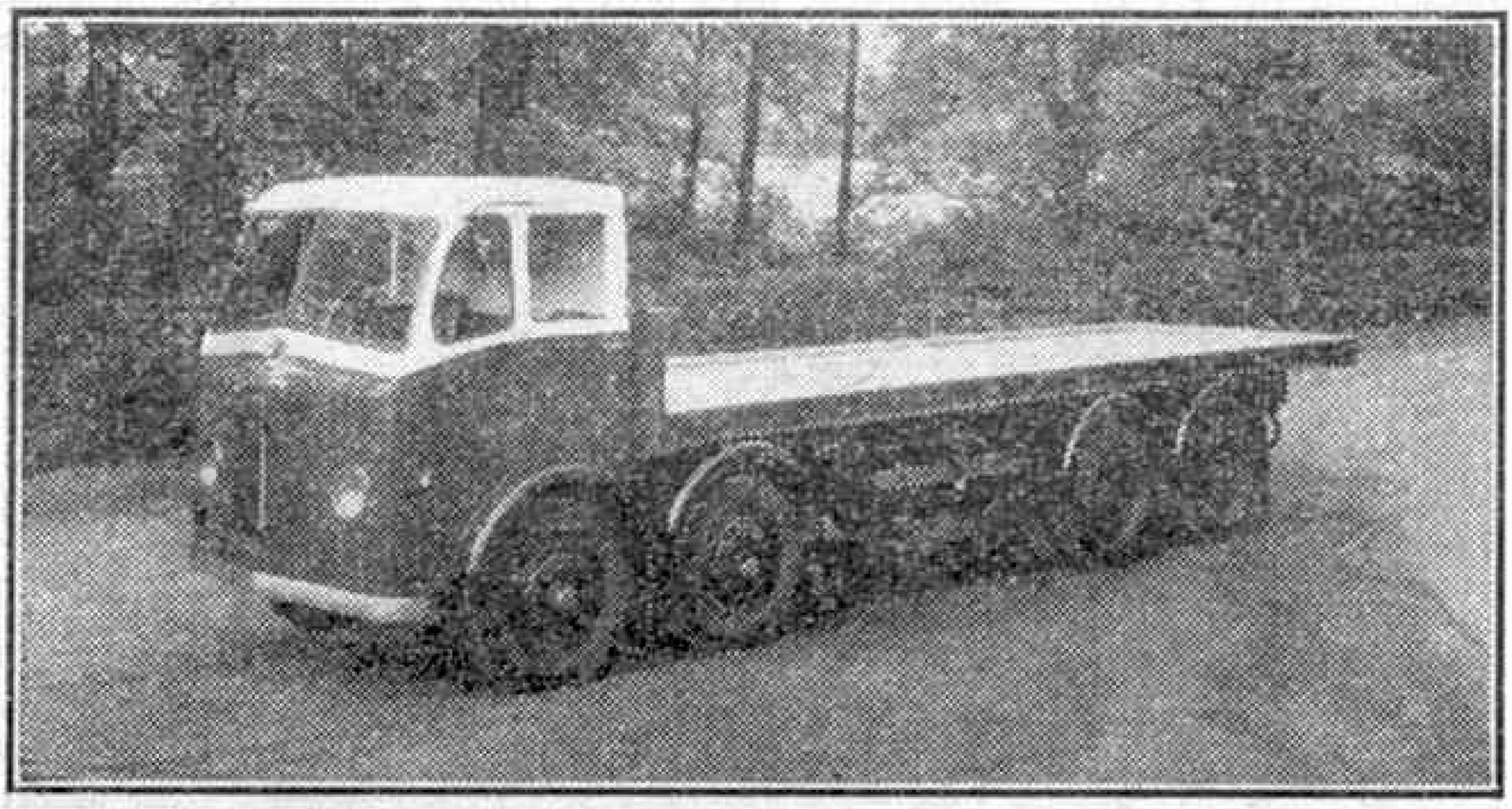
In salvage operations the diver is still the key man. On him rests the responsibility of advising the salvage officer as to the damage below. So far as his dress is concerned very little change has taken place in Mr. Siebe's original outfit of 100 years ago, except that the diver can telephone instead of pulling a cord, and the process devised by Dr. John Haldane obviates "bends" and compressed air illness, from which all divers suffered in the past. Divers, however, cannot do much, if any, work at a depth of 150 ft., but in the case of the "*Egypt*" which lay in about 320 ft. of water, and the "*Niagara*" which was in 400 ft. of water, men

(*Continued on page 436*)

On The Road

New Leyland Lorries

The new range of Leyland freight vehicles includes the 7-ton "Beaver" with its two-axle chassis and 15 ft. or 12 ft. 6 in. wheelbase, and the three-axled twin steering "Steer," which takes loads up to 9¾ tons. Another new-



The Leyland "Octopus." Photograph by courtesy of Leyland Motors Ltd.

comer is the six-wheeled "Hippo," which has a two-axle driving bogie. Of this there are two models, of 15 ft. 6 in. and 17 ft. 9 in. wheelbase respectively, and they carry loads up to 12 tons. Finally there is the "Octopus," which has a rigid eight-wheeled chassis and twin rear axle drive. The "Octopus" is illustrated on this page. It has a sturdy wheelbase of 17 ft. 9 in. and is designed for gross loads of approximately 15¾ tons.

All these vehicles have the engine alongside the driver, but the "Beaver" and "Hippo" are available also in a bonnet version for export, designed for the purpose of keeping down the temperature in the cab as much as possible in hot climates.

The lorries are all equipped with a new six-cylinder direct-injection compression ignition oil engine of 125/130 b.h.p. at 1800 r.p.m. The bore and stroke are 4.8 in. and 5.5. in. respectively, and the compression ratio is 15.75 to 1. A five-speed gear-box is fitted. In this the 3rd, 4th and 5th gears are in constant mesh, and the 3rd and 4th speeds are provided by helical gears, facilitating quiet operation.

One Pedal Control

The lower illustration on this page shows a Crossley oil engined double-deck omnibus supplied to the South Shields Corporation. A feature of this is the incorporation of a Brockhouse Turbo-Transmitter, which takes the place of the normal friction clutch and forward gears; this supplies the variable gear, which automatically adjusts itself to the various loads and speeds. The only control pedal required apart from that for the brake is the accelerator, and because of this the buses equipped with the system are usually described as "One pedal control" vehicles.

Driving these buses is quite a different proposition from the usual routine. There is no clutching and de-clutching, or gear changing even when starting, for this is done by pressing the accelarator pedal gently. The handbrake is only used when starting the engine or during long periods of idling, and a mechanical reverse gear is fitted for reversing, because Turbo-transmission only provides the forward motion.

Direct Injection Fuel Pumps

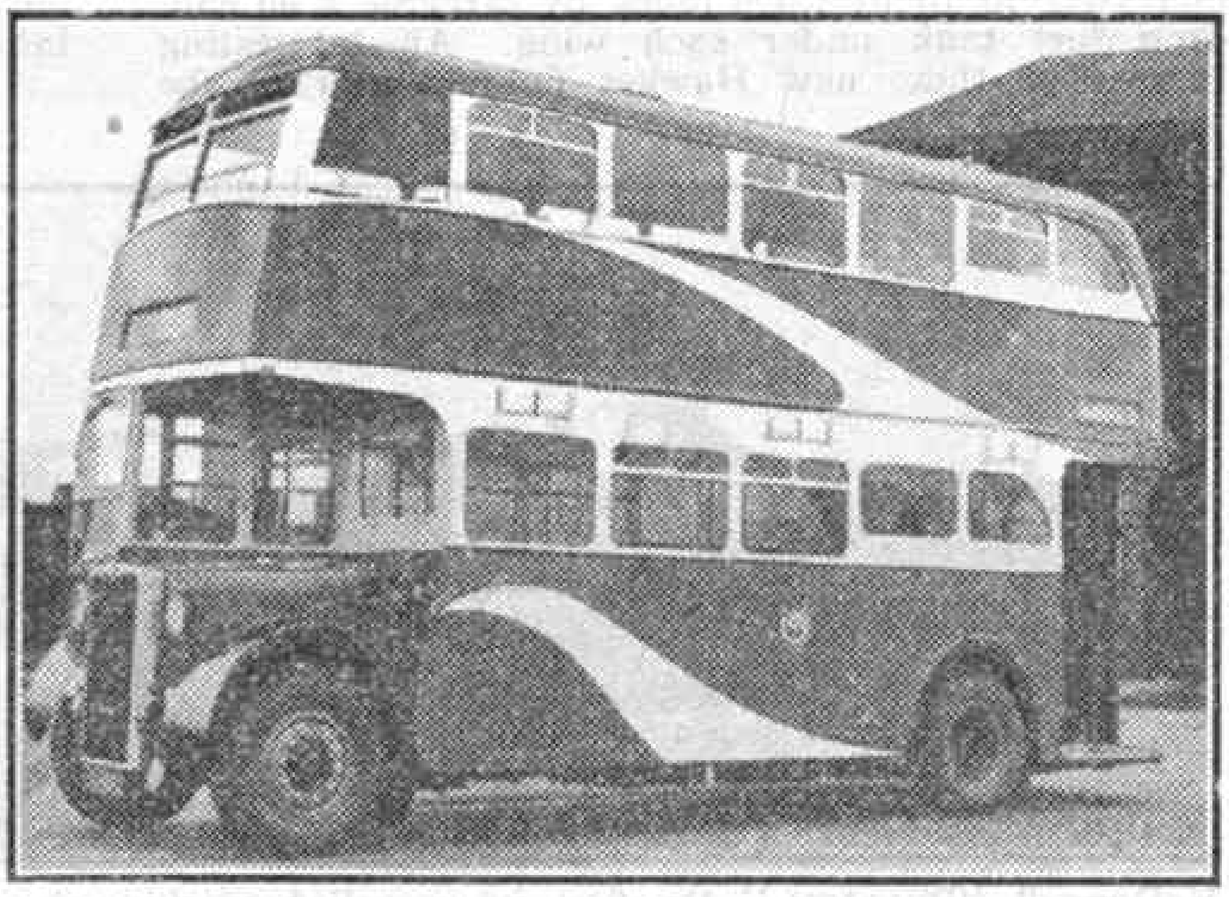
Sir Miles Thomas, Vice-Chairman of the Nuffield Organisation, recently visited Switzerland in connection with the development of the direct injection fuel pump, and conferred with Swiss engineers on the possibilities of applying these new principles to lorries and perhaps light cars. With the direct injection pump more power is developed from a given quantity of petrol than with a carburetter of normal type, and a lower grade of fuel can be used. The motorist therefore would benefit considerably by an increased mileage per gallon if a suitable design for cars could be evolved.

Telephones for Motor Cars

American plans for a two-way radio-telephone service in motor cars are well advanced, and it is expected that the system will be in operation in the New York area in the near future. The owner of a car equipped with this will be able to make local calls while actually on the road, and operators can call the car owner himself by ringing his individual mobile-telephone number, which will cause a light to flash on the dashboard of the car. It is surmised that trunk and even transatlantic calls will become possible later.

The R.A.C. Handbook

After a lapse of six years, the Royal Automobile Club Guide and Handbook is once again available to the motoring public. The 1946–47 issue contains nearly 600 pages of useful information and 32 pages of maps. It gives particulars of the hotels, garages, repairers, parking places, golf clubs, places of interest and other local information relating to over 3,000 towns and villages in Great Britain and Ireland, and includes a coloured atlas, with road numbers and mileages, and 70 street plans of the larger towns showing by-passes and through routes. There are also particulars of steamship services, ferries and tolls.



A Crossley "One Pedal Control" omnibus in South Shields. Photograph by courtesy of Crossley Motors Ltd.

Air News

Record England-New Zealand Flight

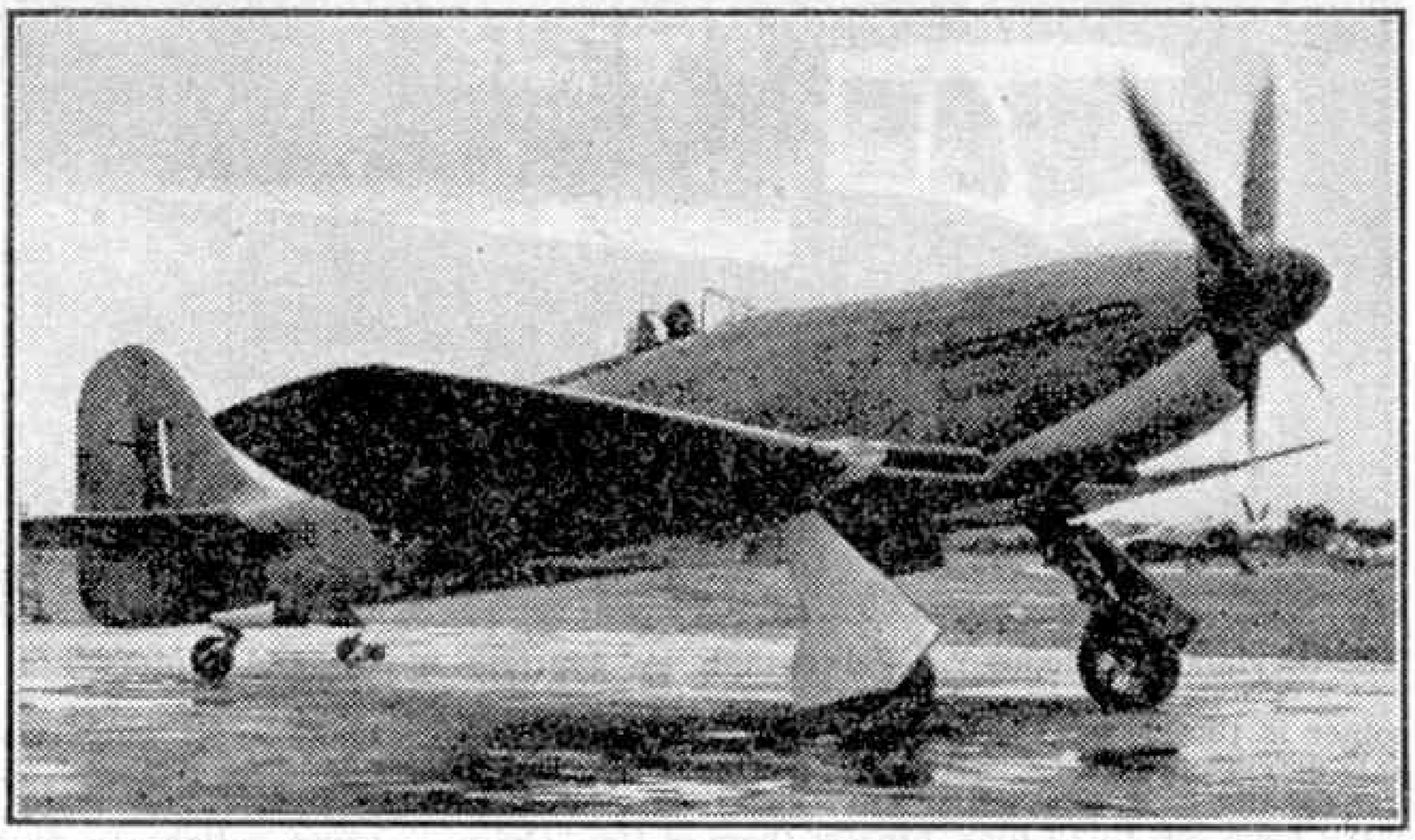
On a recent flight to Australia and New Zealand the R.A.F. "Lancaster" aircraft "*Aries*," of the Empire Air Navigation School, Shawbury, set up three new records. The machine took off from Blackbushe aerodrome, near Camberley, Surrey, and covered the first lap to Karachi in the record time of 19 hr. 14 min. From there it flew on to Colombo, in Ceylon, and thence by way of the Netherland East Indies and the Timor Sea to Darwin, Australia, where it landed 45 hr. 35 min. after leaving Blackbushe, setting up a new record for an England-Australia flight. The final stage was from Darwin to Okahea aerodrome, Wellington, New Zealand. This great flight from England was made in the record overall time of 59 hr. 51 min.

The Latest Hawker "Fury"

In my note on the new "Centaurus"-engined Hawker "Fury" and "Sea Fury" fighters in the February 1946 "*Air News*" I mentioned that some later "Furies" would have "Sabre" liquid-cooled in-line engines. One of these later machines is illustrated on this page. For sheer cleanness, compactness and ingenuity of design this aircraft is outstanding. The cowling round its 3,000 h.p. "Sabre" VII engine is beautifully streamlined, as the coolant radiators are carried in the wing leading edges, only the small carburettor air intake remaining under the nose.

The all-metal "Fury" I is basically similar to the "Sea Fury" X, except for its engine installation and the deletion of purely naval equipment such as the arrester hook. It is armed with four 20 mm. cannons, two in each wing, and can also carry six or twelve Mk. VIII "zero-length" rocket projectiles or two 1,000 lb. bombs under its wings. A top speed of over 475 m.p.h. is combined with a rocket-like climb, and the normal range of 450 miles can be increased to about 1,500 miles by carrying a 90 gall. drop fuel tank under each wing. An interesting feature of these new Hawker fighters is that the main fuel tanks are constructed on the American Mareng (Martin Engineering) principle and consist of a non-metallic flexible self-sealing rubber bag.

J.W.R.T.



The latest Hawker "Fury" I fighter, fitted with 3,000 h.p. "Sabre" VII engine. Photograph by courtesy of Hawker Aircraft Ltd.

A Carrier-Based Jet Fighter

The new twin-engined McDonnell FD-1 "Phantom," shown in the lower photograph on this page, is the first jet-propelled aircraft to be designed exclusively for operation from aircraft carriers, and has just completed its flight tests with the American Navy. It took off for the first time from the U.S.S. "*Franklin D. Roosevelt*" on 21st July last, and in subsequent tests proved itself a first-class ship-board interceptor fighter. Exact performance figures are still secret, but it has a top speed of over 500 m.p.h. and a ceiling of well over 35,000 ft. It has a correspondingly good rate of climb.

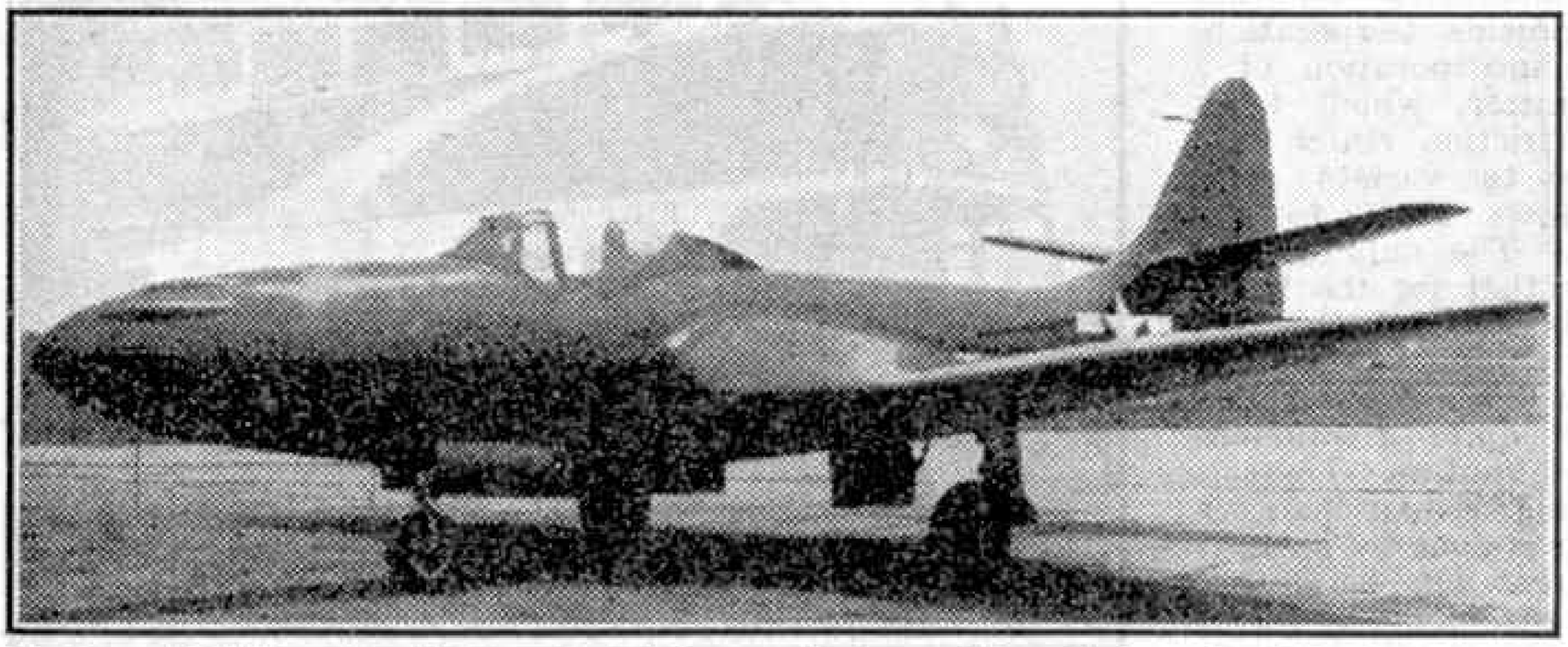
The FD-1 "Phantom," 30 of which are being built, is powered by two of the new Westinghouse 19-B axial-flow jet units, the first American designed jet engines. They develop only some 1,360 lb. thrust each, but this is partly offset by the small diameter of 19 in. which has enabled them to be installed very neatly in the wing roots. A new version, the FD-2, will soon be put into production with Westinghouse 19-C engines, developing 1,600 lb. thrust each. The "Phantom" is armed with four or six .50 in. machine guns carried in the nose, and provision is also made for carrying rocket projectiles or a belly drop fuel tank.

J.W.R.T.

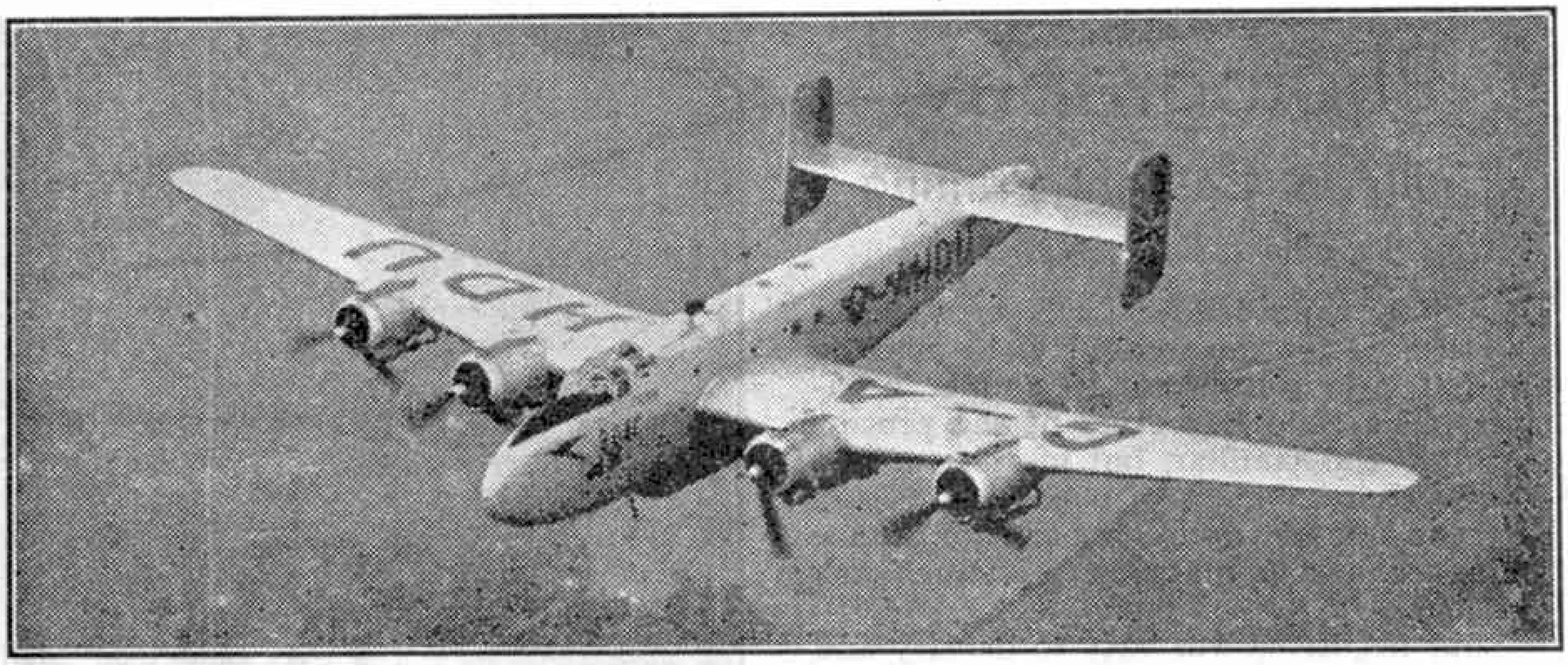
* * * *

It was announced last month that six Boeing "Stratocruisers" have been ordered by British Overseas Airways Corporation. This huge 4-engined double-deck air liner is a commercial development of the Boeing C-97, which was illustrated on page 434 of the December 1945 "*M.M.*" and is the transport counterpart of the "Superfortress" bomber.

United Air Lines, U.S.A., have ordered seven of these aircraft, delivery to begin in the Autumn of 1947.



McDonnell "Phantom," the first jet-propelled machine designed solely for aircraft carrier service. Photograph by courtesy of McDonnell Aircraft Corporation, U.S.A.



"Falkirk," the first of a fleet of Handley Page "Halton" aircraft for British Overseas Airways Corporation, by whose courtesy this photograph is reproduced.

B.O.A.C. to Operate "Haltons"

A fleet of 12 Handley Page "Halton" aircraft is going into service with the British Overseas Airways Corporation, on the U.K.-Cairo and Karachi and U.K.-West Africa Trans-Sahara routes. The first of these machines, named "*Falkirk*," is shown in the upper photograph on this page.

The "Halton" is the civil transport version of the "Halifax" CVIII with its interior completely transformed in order to provide comfortable accommodation for 10 passengers. Seats are upholstered in blue all-wool rep, there is a blue carpet, and curtains are of a contrasting rust colour. Adjustable tables are provided, and there is a wardrobe for the stowage of top coats and similar articles. Other alterations include a new, large entrance door on the starboard side of the machine, a large window adjacent to each of the passenger seats, a galley and toilet accommodation, and the conversion of the bomb-bay into a compartment able to accommodate 8,000 lb. of baggage, freight and mail.

The "Halton" is fitted with four Bristol "Hercules" 1,650 h.p. air-cooled engines, and has a top speed of 320 m.p.h. It cruises at 260 m.p.h. at about 10,000 ft. and its still-air range is some 2,700 miles.

Argentina Buys British

In addition to the air liners listed in last month's "*Air News*" the Argentine Aeronautical Purchasing Commission visiting Britain has placed still further orders for British aircraft. The machines required include 15 Bristol "Wayfarers" and 150 Miles "Magisters." The "Wayfarers" will be fitted out to carry 15 passengers and a heavy load of freight, and this contract alone contributes some £500,000 to the British export drive.

The "Magister" contract is worth nearly £175,000 and includes the provision of a complete set of spares for each machine. All these "Maggies" were originally built for the R.A.F., but the end of the war made them surplus to Training Command's requirements. So they were re-purchased by Miles Aircraft, and after being reconditioned at Reading they have now been despatched to South America.

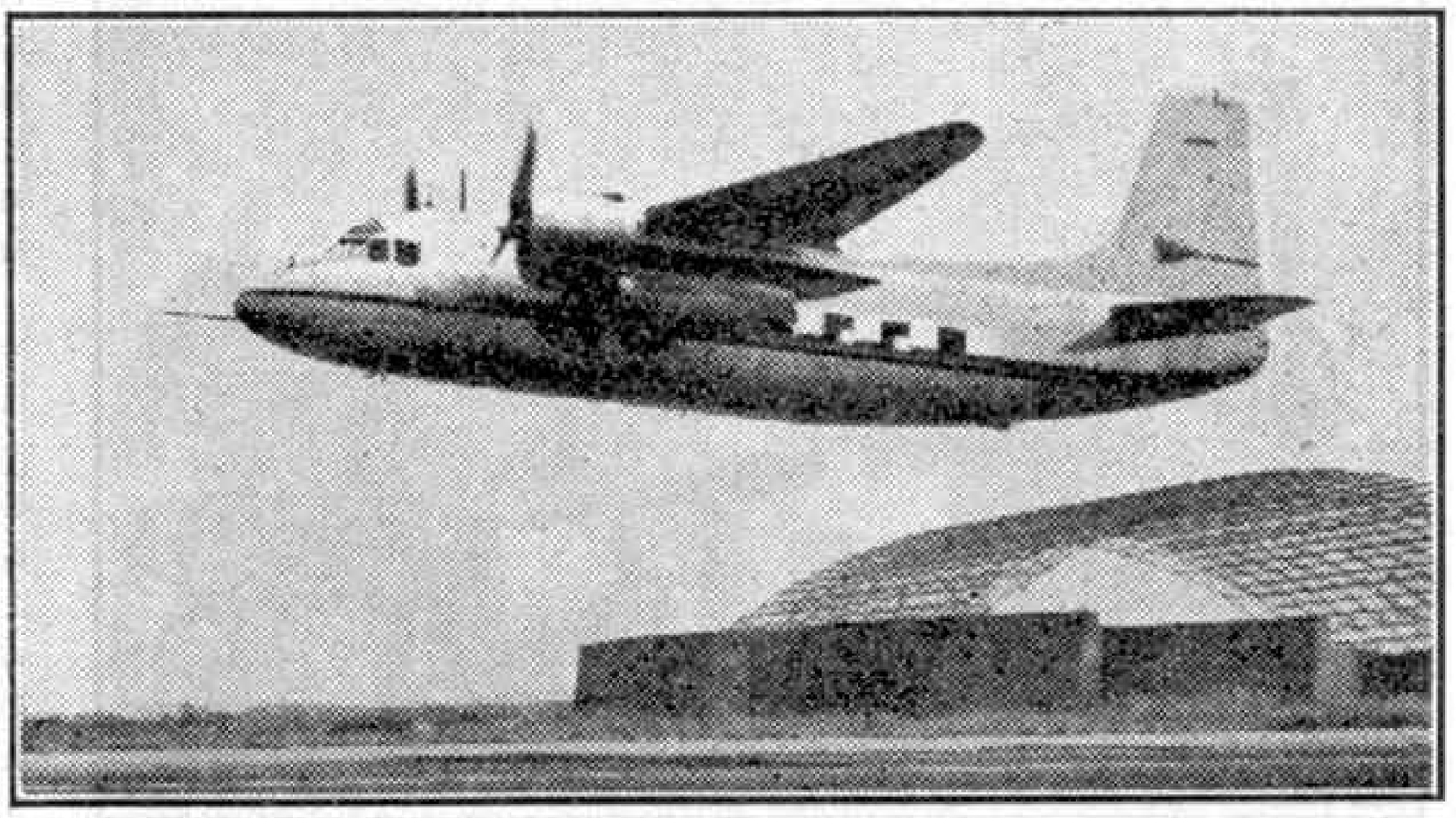
J.W.R.T.

New Lockheed Transport Aircraft

Preliminary flight tests have been completed of the "Saturn," the Lockheed twin-engined medium transport aircraft intended for airline service between small-town airports off the main trunk air routes. This new Lockheed machine is illustrated on this page.

The "Saturn" is designed to carry 14 passengers or 3,000 lb. of cargo, or any intermediate combination of the two, a quickly movable cabin bulkhead between the passenger and cargo compartments allowing the accommodation to be adjusted to meet requirements for any given flight. Noticeable external features of the machine are its high wing, providing unobstructed view for all passengers; its unusually high rudder, and the low slung fuselage reached from the ground by a step of only 34 in. that folds inconspicuously into the machine when this is in flight. This low fuselage does not require the provision of expensive ground handling equipment at small-town airports, as trucks can drive right up to the cargo door for loading and unloading.

The machine can be fitted with two 600 h.p. "Continental" engines or two 800 h.p. Wright "Cyclones." Although designed primarily for efficiency on shorter regional flights, it has a maximum range of nearly 2,000 miles. It takes off in 1,500 ft., and at its gross weight of 16,000 lb. it climbs 1,325 ft. a minute. The top speed of the "Saturn" is more than 250 m.p.h., and at 60 per cent. power it cruises at over 200 m.p.h.



The Lockheed "Saturn" transport lightly clears the runway on its first test flight. Photograph by courtesy of Lockheed Aircraft Corporation, U.S.A.

Photography

Faults in Gaslight Printing

By John J. Curtis, A.R.P.S.

BY this time readers will be turning their attention seriously to making gaslight prints from their summer negatives. The general routine of the process is simple and familiar, but in spite of this many precious sheets of paper are wasted as the result of wrong exposure or stains. Here are a few hints on avoiding such wastage.

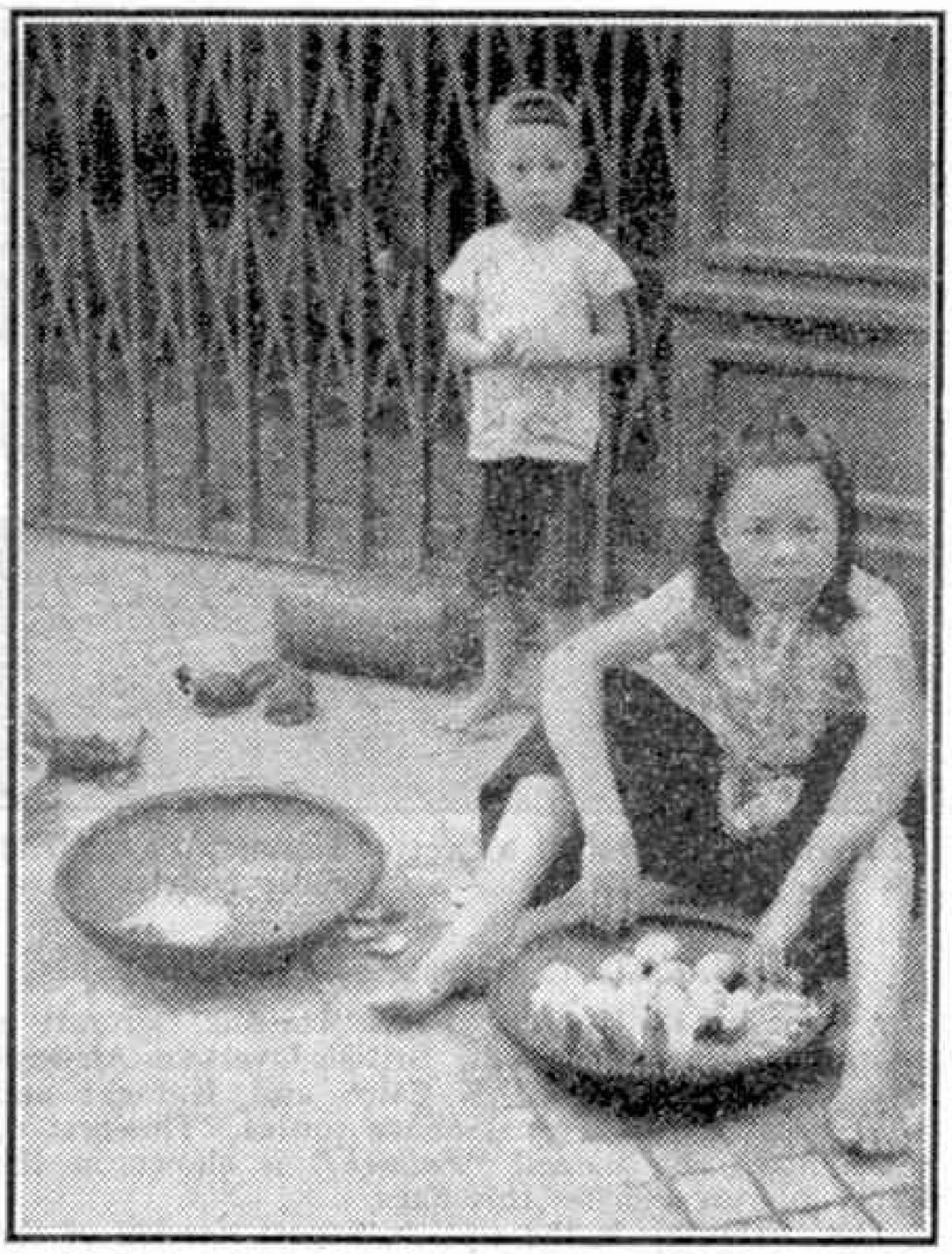
Your negatives will vary in density and therefore will require different exposure times. Separate them into three groups—thin, medium and dense. Then, when you have found the right exposure for one negative of each group, you can deal with the rest with certainty. For the trial exposures cut a sheet of paper into four or five strips and make a test with each, varying the exposure, but keeping the printing frame always at the same distance from the light. For example, with a distance of 15 in. from the light give one strip six seconds and the next 12 seconds. Then develop the strips and note the results. If the image flashes up in the developer you have overdone the exposure; if it takes a long time to show, more seconds must be allowed. Correct exposure means that development should be complete in about 30 to 45 seconds or at most 60 seconds. A few experiments of this kind will provide all the information you need.

Stains will occur if you use the same developer too long. Watch for any change from the correct blue-black tone of the prints, and when this occurs throw away the developer. A few drops of Johnson's 142 Solution will help to avoid developer stains. Use an acid-fixing bath such as Johnson's Acid Hypo Fixing.

When the print is ready to leave the developer do not waste time examining it, but plunge it into the fixer, submerge it face downwards and move it about for the first few seconds. Remember to rinse your fingers thoroughly before continuing printing and developing.

Clean off finger prints or other marks on the back of the negative; at the same time remove any dust from the surface of the film. Also do not forget to clean the glass in the printing frame.

It is not necessary to use a yellow or orange light for developing gaslight paper if you keep in shadow the part of the table where you load and unload the printing frame and carry out developing operations. Do not forget to cover up the stock of paper after you have withdrawn a sheet. Failure to do this may prove expensive!



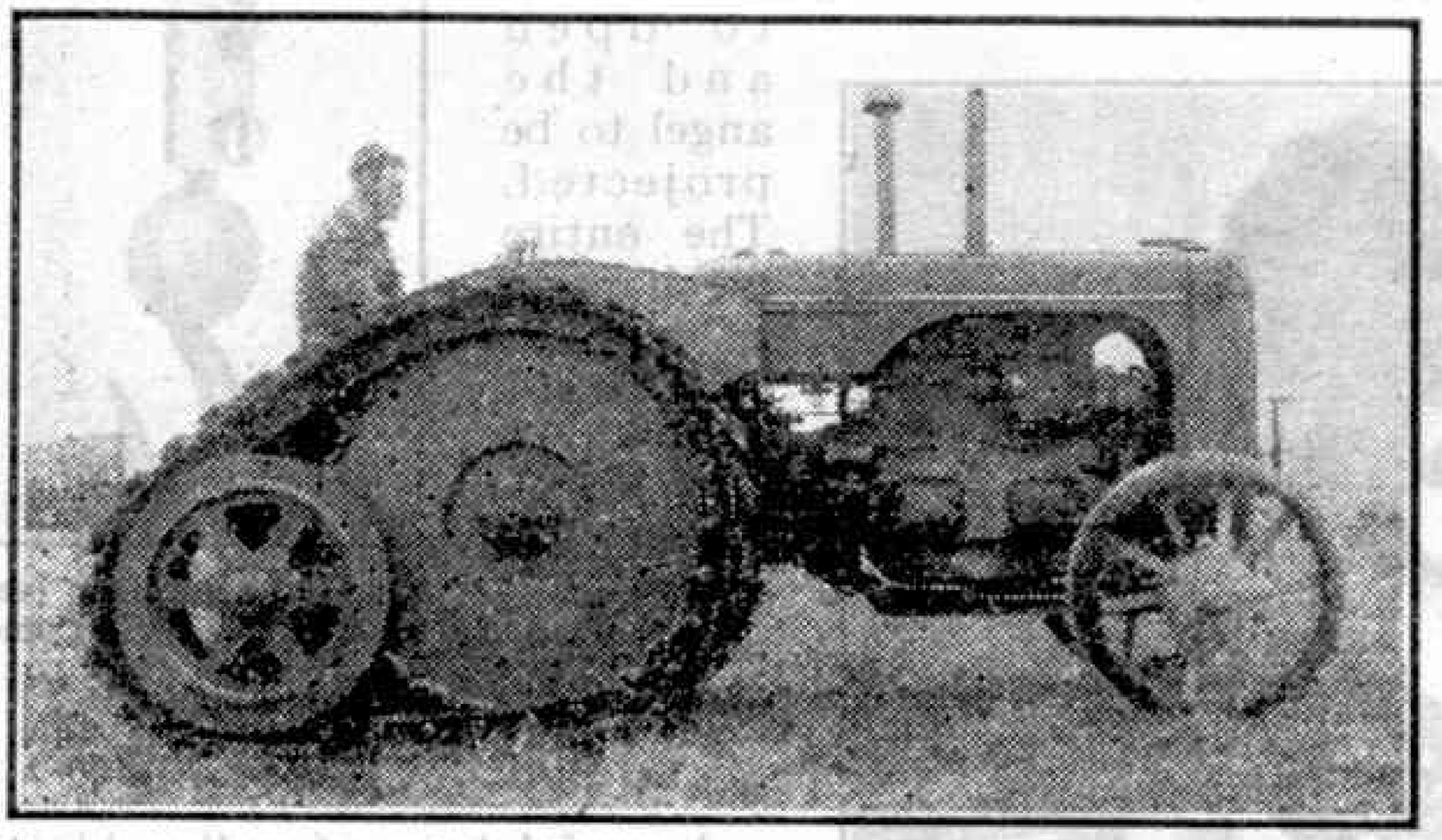
Chinese fruit seller, Saigon. Photograph by L.A.C. R. Atkins, Eccles.

Cottages at Bognor Regis. Photograph by F. G. Reynolds, Sidcup.

Engineering Notes

Tracks Versus Wheels

The upper illustration on this page shows a special type of tractor mounted on what are known as D.G. Tracks, which are manufactured by Roadless Traction Ltd., Hounslow. Tracks have many



A tractor mounted on type D.G. track equipment. For this illustration and the one below we are indebted to Roadless Traction Ltd., Hounslow.

advantages over wheels when heavy loads or soft ground are involved and the maximum tractive effort is required. Wheel diameter has a great influence on wheel efficiency. For operation over anything but a good hard road surface any wheel much less than 12 in. in diameter is useless. It is of course possible to use larger wheels and with increased diameter the efficiency is greater, but it is found that wheels over 5 ft. 6 in. in diameter are impracticable owing to various mechanical difficulties which arise beyond this limit.

The special feature of the D.G. Track fitted to the tractor illustrated is that when it is in operation it is in effect the rigid rim of an immense wheel. When first assembled the track has a curvature equal to that of a wheel 15 ft. in diameter, but after a few hundred hours of work it settles down to a curve equal to a wheel approximately 20 ft. in diameter. As time goes on a continual flattening process takes place and the performance and efficiency of the machine steadily increase, due to the fact that it is in effect operating with rear wheels of larger and larger diameter.

The lower illustration was taken with the track uncoupled and opened out to demonstrate the claim that it is in effect a wheel of very large diameter.

A Wonderful Electric Calculator

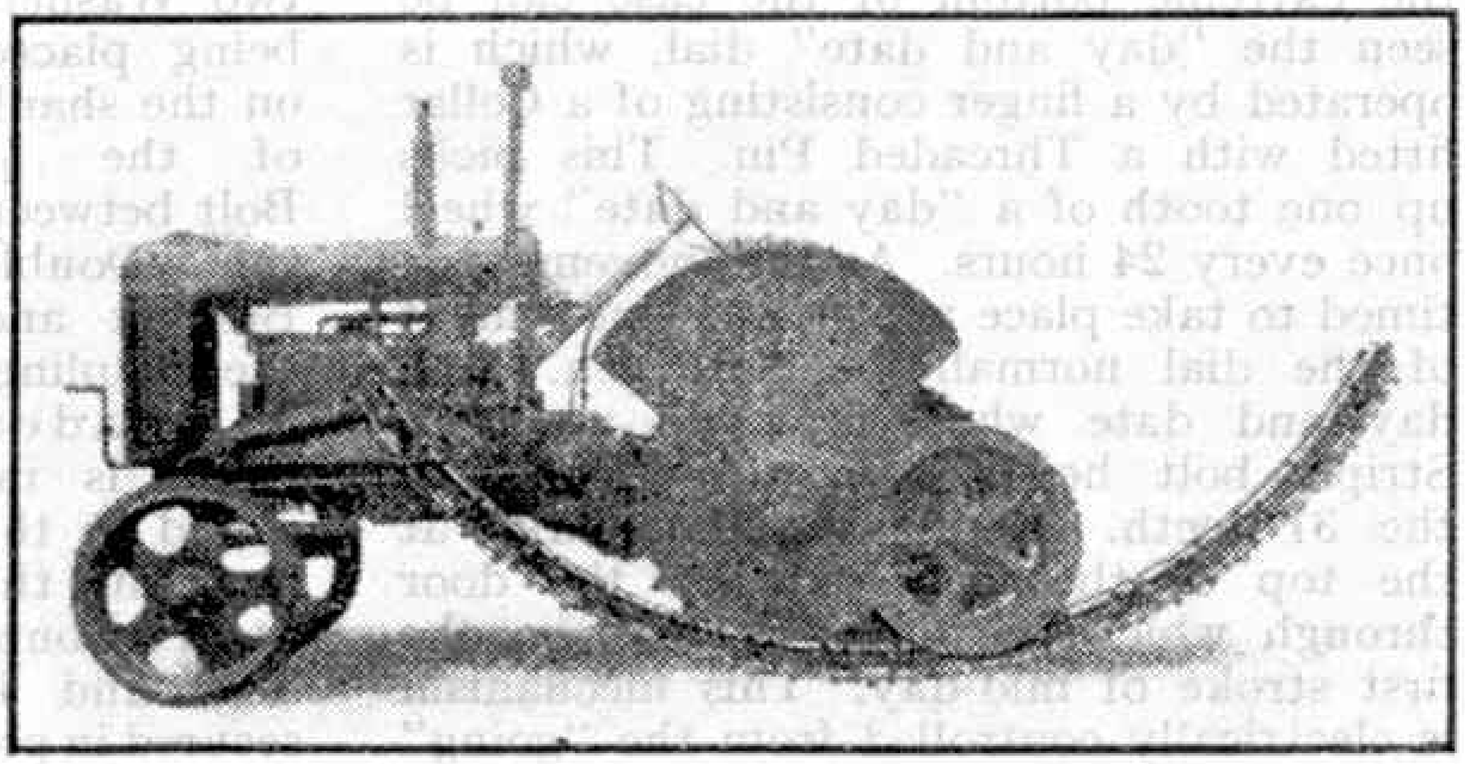
A new electrical calculating machine, known as Eniac, is in use in the United States. It is said to be capable of solving complex scientific problems that cannot readily be solved by any other existing method, and to be able to work 1,000 times faster than any ordinary calculating machine.

The machine occupies a room 30 ft. × 50 ft. and incorporates over 18,000 electric vacuum valves. The machine has uses in connection with scientific weather prediction, aerodynamics and physics, and during the war was used in the compilation of gun firing and aerial bombing tables.

Research laboratories working on jet engines are keenly interested in the machine.

A New Submarine Telephone Cable

A new kind of under-sea telephone cable is to be tested experimentally between Portsmouth and Ryde, I.O.W. If the tests are successful the new cable will be laid for telephone communication between Great Britain and the Continent. The cable is capable of carrying several simultaneous conversations.



This illustration shows how the D.G. Track is in effect the rigid rim of a great wheel approximately 20 ft. in diameter.

Among the Model-Builders

By "Spanner"

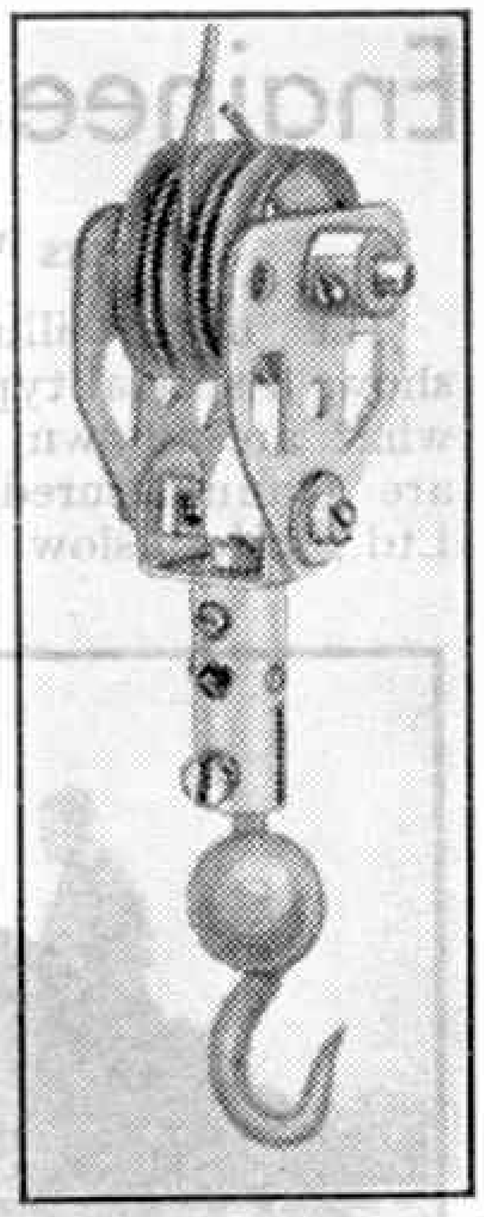
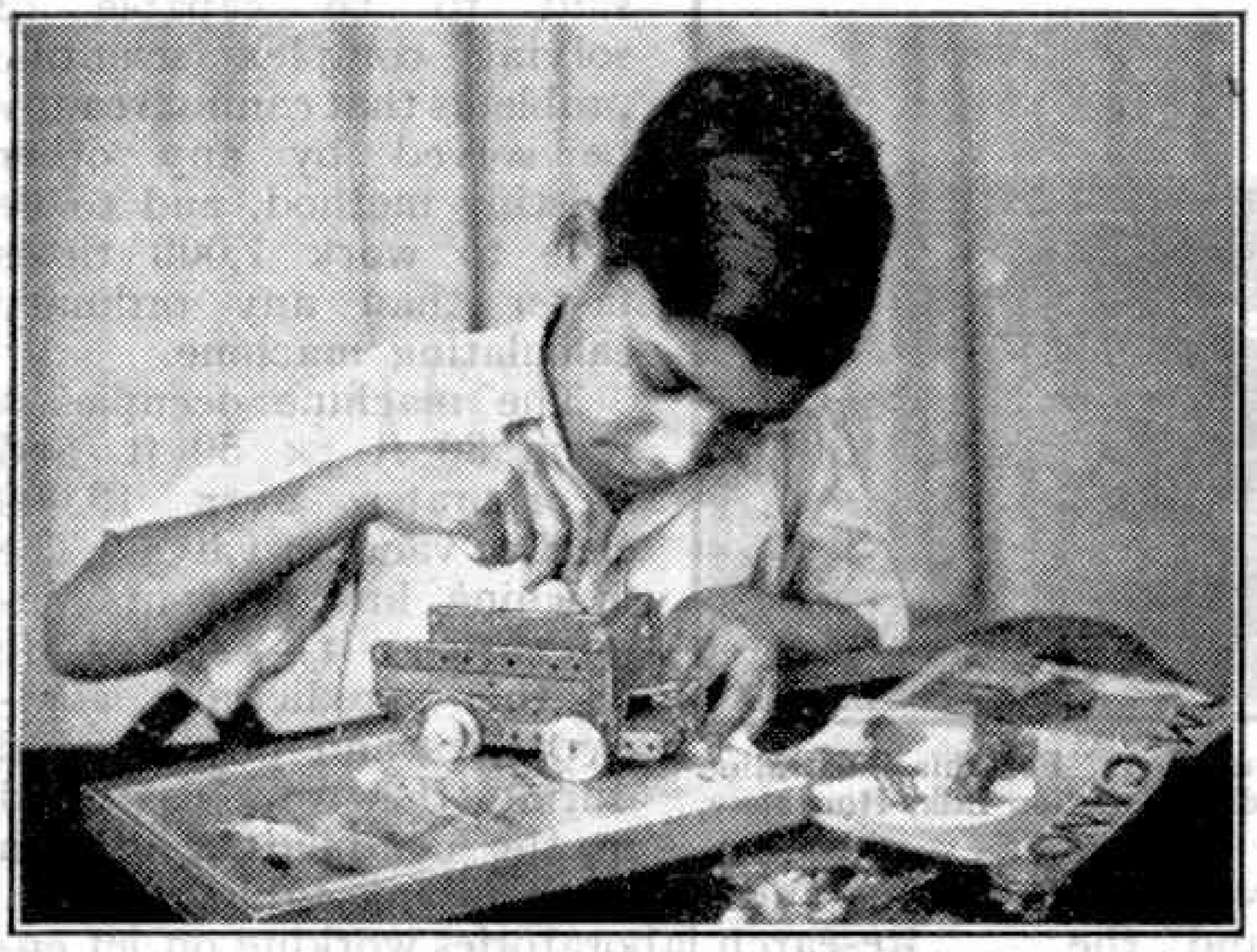


Fig. 1. A built-up load hook for a crane.



Subas Chand, Secunderabad, India, an enthusiastic Meccano boy, at work on a simple model.

A Fine Meccano Wall Clock

Mr. L. Dougal, West Wimbledon, is an expert Meccano model-builder and has considerable experience in the construction of clock mechanisms of various kinds. One of his models of this type is reproduced in Fig. 2. This represents an old-fashioned bracket clock, and its mechanism shows the minutes, hours, phases of the moon, day and date, strikes the hours and half-hours, and in addition, at mid-day causes a small door in the case to open and a miniature figure of an angel to emerge.

The timing and striking gear trains are each operated by a separate weight. At the extreme bottom of the case can be seen the "day and date" dial, which is operated by a finger consisting of a Collar fitted with a Threaded Pin. This picks up one tooth of a "day and date" wheel once every 24 hours. As the movement is timed to take place at 2.0 a.m., movement of the dial normally is not seen. The day and date wheel is made up from Strips, bolt heads being used to form the 31 teeth. Above the lunar dial at the top of the clock is seen the door through which the angel appears on the first stroke of mid-day. This mechanism is electrically controlled from the "going" train. A master switch is closed at 11.55 a.m., and on the first stroke of mid-day a further switch is closed by the striking hammer. This causes a "striker" to be repelled from the core of a solenoid, thus causing the door to open and the angel to be projected. The entire mechanism is an excellent example of carefully planned construction and a very fine achievement.

A Built-up Pulley Block

A useful type of pulley block is illustrated in Fig. 1. The sheaves are carried on a $1\frac{1}{2}$" Rod passed through Flat Trunnions secured to a Double Bracket. A $\frac{1}{2}$" Bolt is passed through the central hole of the Double Bracket and it is inserted in the bore of a Strip Coupling and held by a set-screw in the Coupling, two Washers being placed on the shank of the $\frac{1}{2}$" Bolt between the Double Bracket and the Coupling. A Loaded Hook is inserted in the slot of the Strip Coupling, and is secured in position by a $\frac{3}{8}$" Bolt and nut.

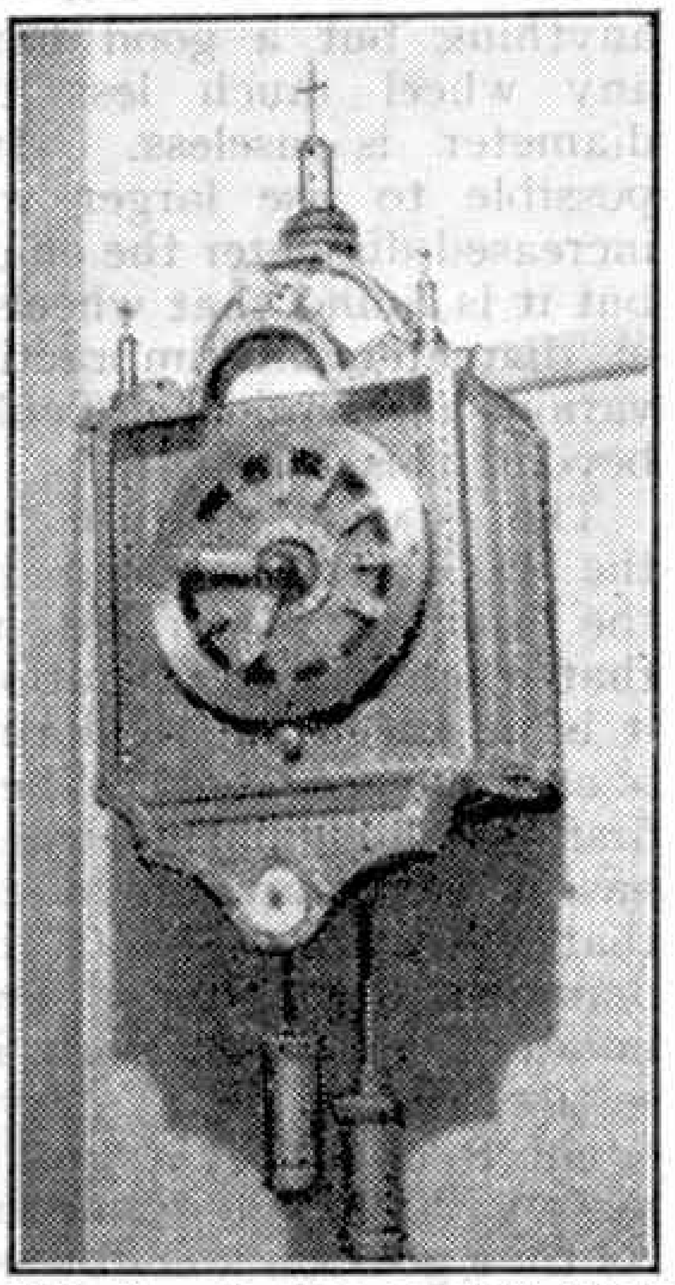


Fig. 2. A fine bracket clock built by Mr. L. Dougal, West Wimbledon.

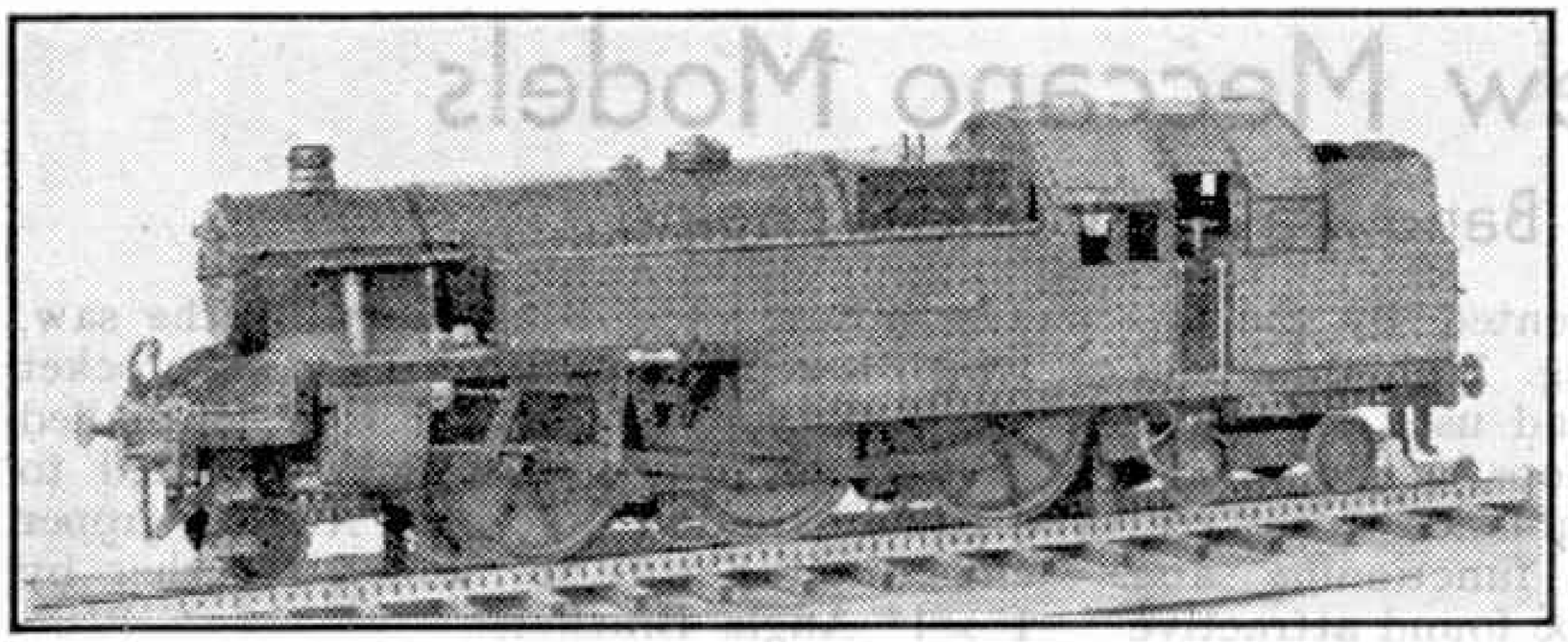


Fig. 3. This realistic model of an L.M.S. 2-6-4 tank locomotive was built by C. Howard, Pendlebury, Hinckley.

Suggestion for a New Meccano Part

Among suggestions received is one concerning a threaded fishplate, of the kind shown in the sketch reproduced in Fig. 4. The suggested part would be similar to the present Fishplate (Part No. 10) with the exception that it would be cut from much heavier metal. The part would have an elongated and a circular hole cut in it, the latter being tapped to take standard Meccano Bolts, Screwed Rods and other threaded parts. By means of the tapped hole it would be possible to lock the article to a rotating member so that it could be used as a cam. Several other uses could no doubt be found for a part of this type, but as most of its functions are already covered by existing Meccano parts, I do not think that its introduction could be justified.

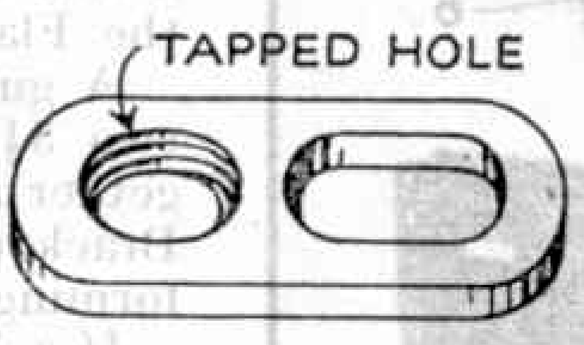


Fig. 4. The threaded fishplate referred to on this page.

A Reader's Three-Speed Gear-Box

From the Transvaal comes an idea for a useful gear-box that is particularly suitable for incorporation in a model crane. It was brought to my notice by P. Horne, Johannesburg, and I am illustrating his mechanism in Fig. 5. Most of the constructional details can be seen in the illustration. The Rod A is held in place by the Collar B. Rod C is movable to the left or right so that the gear wheels can mesh with those on the Rod A. The extent to which it can move to the left is controlled by the number of Washers D. Movement of the Rod C is controlled by the Crank E, which is attached to the frame by a Rod in the manner shown in the inset. The Pinion F must always be in mesh with Pinion G, as the Rod H is the one through which the drive leaves the gear-box. The wide face of this Pinion makes allowance for the movement of the Rod C.

The Crank E can easily be attached to a lever placed some distance away from the actual gear-box. The Axle Rod A is connected to the source of power.

When the slowest speed is required, the Crank E is pushed to the extreme left so that the Pinions J and K mesh. For the intermediate speed the Pinions L and M are made to mesh by moving the Crank to the extreme right. Third speed is obtained by moving the Crank to the left.

This arrangement will prove a valuable addition to a number of models where a constant mesh mechanism must be incorporated on the driving shaft coupling. It also provides a good rigid mounting for the output shaft, since the latter does not slide. During the changing of gears it is necessary to pass through third speed in order to obtain second speed, but this will not affect the general working order of the gear-box.

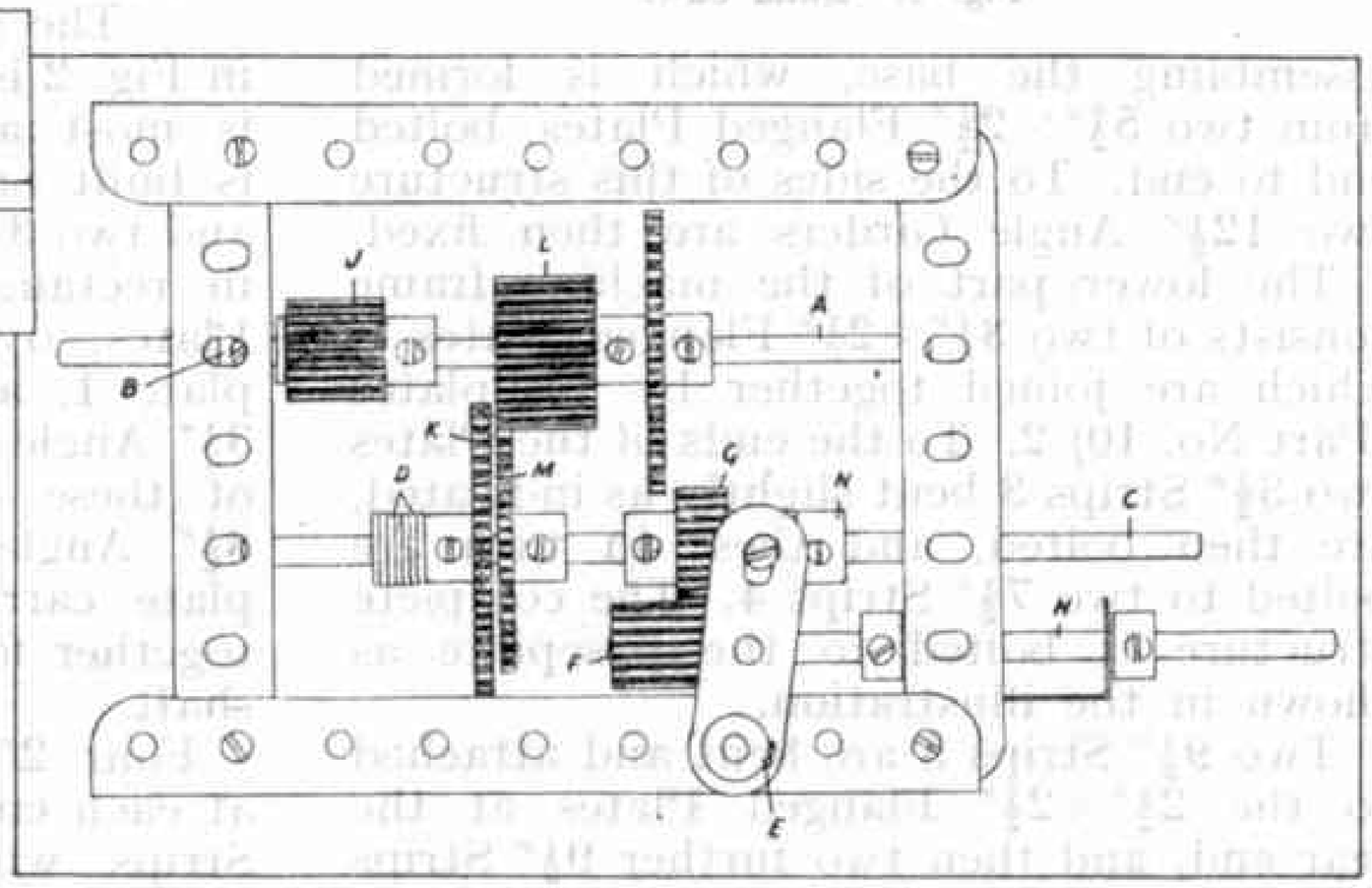


Fig. 5. An interesting three-speed gear-box designed by P. Horne, Johannesburg.

New Meccano Models

Band Saw—Vertical Engine

THE machine represented by the fine model shown in Fig. 1 on this page is a band saw of the kind used in joinery and carpentry workshops. The model bears a very close resemblance to the real machine, both in its functioning and appearance, and it will be found attractive to build.

It is best to commence construction by

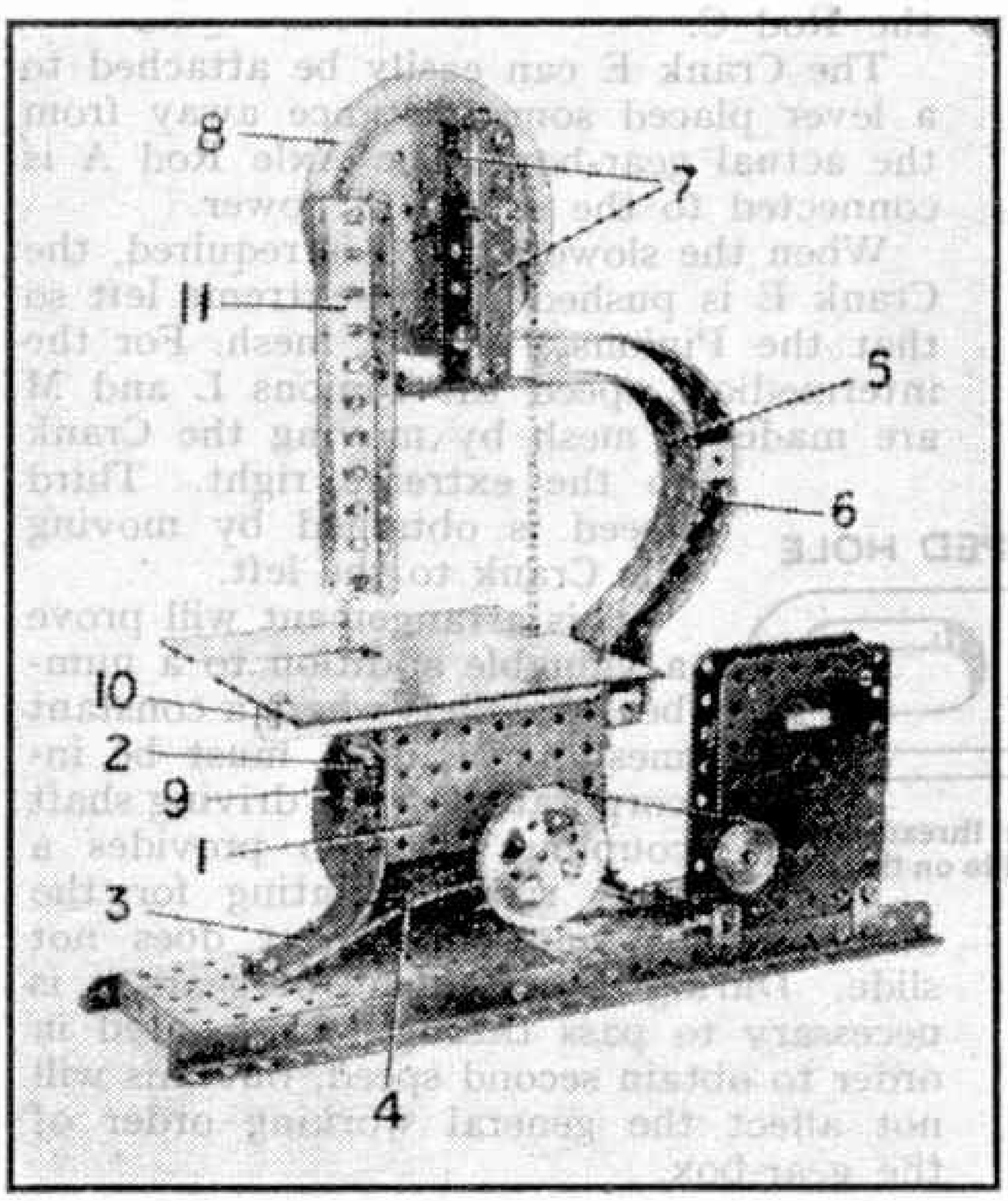


Fig. 1. Band Saw.

assembling the base, which is formed from two $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plates, bolted end to end. To the sides of this structure two $12\frac{1}{2}''$ Angle Girders are then fixed.

The lower part of the machine frame consists of two $3\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plates 1, which are joined together by Fishplates (Part No. 10) 2. To the ends of the Plates two $3\frac{1}{2}''$ Strips 3 bent slightly as indicated, are then bolted, and these in turn are bolted to two $7\frac{1}{2}''$ Strips 4. The complete structure is bolted to the baseplate as shown in the illustration.

Two $9\frac{1}{2}''$ Strips 5 are bent and attached to the $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plates at the rear end, and then two further $9\frac{1}{2}''$ Strips 6 are connected to the first pair by Double Brackets, spaced in the manner indicated.

The upper wheel 8 for carrying the saw, which is represented by a belt of Sprocket Chain, is supported on a Rod journalled in two $3\frac{1}{2}''$ Strips 7, which are fixed to a pair of Double Brackets. At their upper ends these Strips are joined together by $1'' \times 1''$ Angle Brackets.

The wheels 8 and 9 that carry the band saw are each formed from a 4" Circular Plate, to which is bolted by two $\frac{1}{2}''$ Bolts a 3" Sprocket. The Sprocket is spaced from the Plate by four Washers on each bolt. The lower wheel is fixed on a Rod journalled in the $3\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plates, and which carries on its opposite end a $1\frac{1}{2}''$ Pulley.

The sawing table is a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flat Plate, which is bolted to a $5\frac{1}{2}''$ Angle Girder 10 fixed to one of the Flanged Plates. A piece of cardboard in which a slot is cut for the saw, is bolted to the Flat Plate.

A guard for the saw is provided by two $5\frac{1}{2}''$ Angle Girders 11, bolted together and attached to a $1'' \times 1''$ Angle Bracket fixed to one of the $9\frac{1}{2}''$ Strips forming the column of the machine.

If a No. 1 Clockwork Motor is available it can be used to drive this model and should be bolted to the baseplate at the rear in the position indicated.

Parts required to build model Band Saw: 2 of No. 1; 4 of No. 1a; 2 of No. 1b; 6 of No. 3; 3 of No. 9; 7 of No. 10; 8 of No. 11; 2 of No. 12a; 1 of No. 16; 1 of No. 17; 1 of No. 21; 1 of No. 22; 67 of No. 37; 4 of No. 37a; 6 of No. 38; 2 of No. 52; 2 of No. 53; 2 of No. 59; 1 of No. 70; 1 of No. 94; 2 of No. 95b; 4 of No. 111a; 2 of No. 146a; 1 No. 1 Clockwork Motor.

The model high speed engine shown in Fig. 2 is a very simple one to build and is most attractive when in motion. It is built on a base consisting of two $2\frac{1}{2}''$ and two $3\frac{1}{2}''$ Angle Girders bolted together in rectangular form. Two $3'' \times 1\frac{1}{2}''$ Flat Plates, overlapped to form a composite plate 1, are then bolted to each of the $3\frac{1}{2}''$ Angle Girders and to the upper edges of these compound plates two further $3\frac{1}{2}''$ Angle Girders 2 are bolted. Each plate carries a Flat Trunnion 3, which together form the bearings for the crankshaft.

Four 2" Angle Girders are bolted one at each end of two $3\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips, which in turn are bolted to the $2\frac{1}{2}''$ Angle Girders of the base. At their upper ends the 2" Angle Girders are

bridged by a $1\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip, forming a platform to support the four columns 5 on which the cylinder 6 is mounted. The columns are $3\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips and at their upper ends is bolted a $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flat Plate 7. Bolted to this Plate are three Boiler Ends placed one on top of each other as shown, the three being held by two Screwed Rods 8, which pass through the Boiler Ends and the Plate 7 and are fitted with nuts at each end.

The valve chest 9 is a Sleeve Piece, inside which are two Chimney Adaptors to provide guides for the valve rod. The crankshaft consists of two 3" Rods, the inner ends of which are gripped in one of the end holes in two Couplings 10. In the other end holes of these Couplings is a 1" Rod carrying a Handrail Coupling. The connecting Rod 11 is held in the Handrail Coupling and at its other end is pivotally connected to the piston rod by a Swivel Bearing. An Eccentric 12 mounted on one end of the crankshaft is extended by a $1\frac{1}{2}''$ Strip, which is locknutted to a Rod and Strip Connector 13 fixed on the lower end of the valve rod.

The crankshaft is fitted with driving pulleys and a Flywheel as shown. The outer driving pulley is a $1\frac{1}{2}''$ Pulley Wheel, and the inner is a 2" Pulley Wheel.

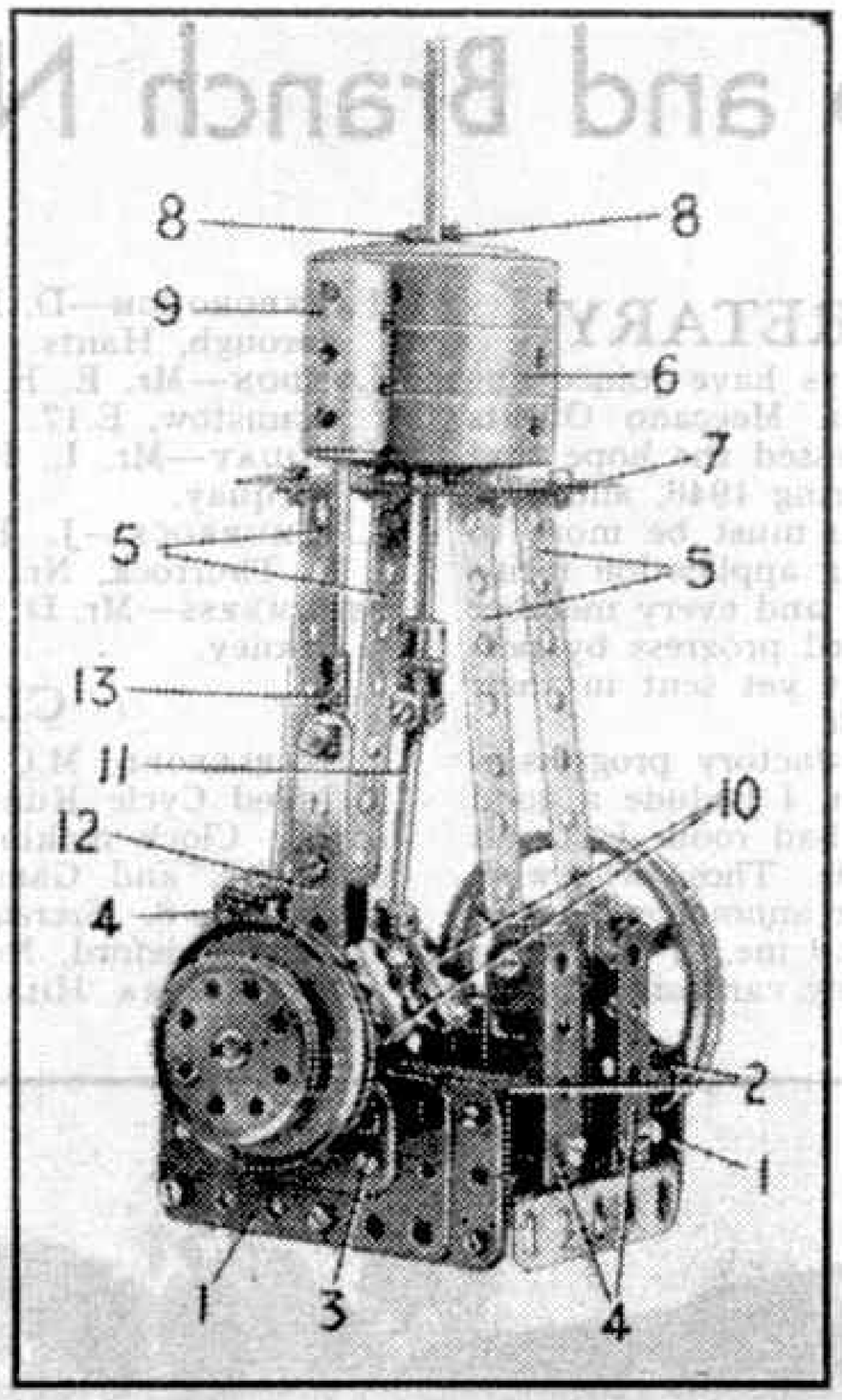


Fig. 2. Simple Vertical Engine.

Parts required to build High Speed Engine: 1 of No. 6a; 4 of No. 9b; 2 of No. 9d; 4 of No. 9e; 1 of No. 15a; 3 of No. 16b; 1 of No. 17; 1 of No. 18b; 1 of No. 20a; 1 of No. 21; 38 of No. 37a; 37 of No. 37b; 2 of No. 48; 6 of No. 48b; 2 of No. 59; 2 of No. 63; 1 of No. 126a; 1 of No. 130; 1 of No. 72; 4 of No. 73; 2 of No. 132; 1 of No. 136a; 3 of No. 162a; 1 of No. 163; 2 of No. 164; 1 of No. 165.

Prizes for Model-Builders

In the September issue of the "*M.M.*" we announced details of a model-building competition for which any kind of Meccano model is suitable. This contest is still open for entries from both Home and Overseas readers, and we are therefore repeating the main details so that readers who did not see the first announcement may have a chance to compete.

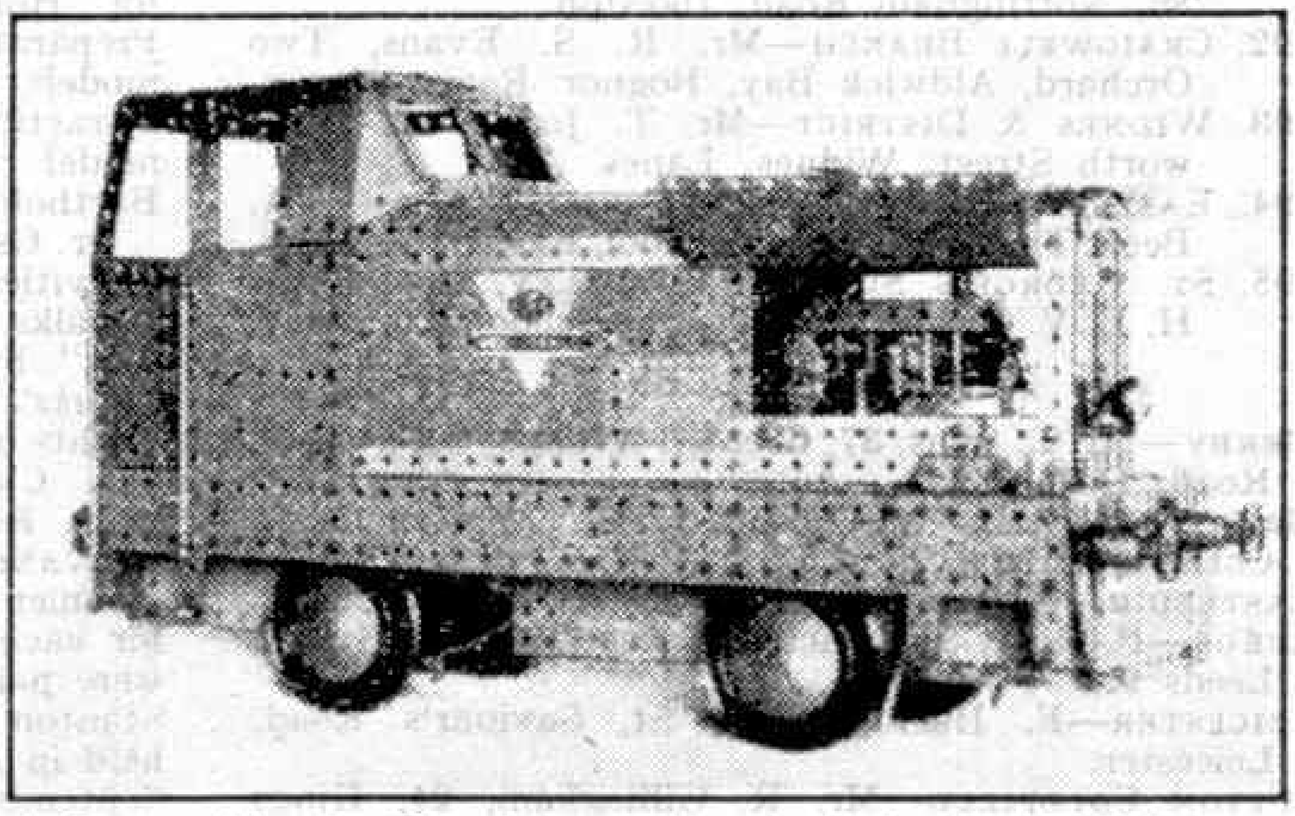
The competition is open to readers of all ages living in any part of the world, and there are no entrance forms to fill in. The only condition is that models must be the competitor's own work, both in design and construction.

In preparing their entries competitors should try and think of something original, that is, some subject they have never seen in the form of a Meccano model. Once the subject has been chosen the next thing is to make a neat model of it using only Meccano parts.

Please note that it is not necessary to send the actual model. A photograph or a good sketch is all that is required. The sender's age, name and address must be written on the back of each photograph or drawing, and these must be forwarded to "*September Meccano Model-Building Competition, Meccano Ltd., Binns Road, Liverpool 13*". A short description of the main features of the model should be sent with the illustrations.

Entries will be divided into two sections as follows: Section A is for competitors living in the British Isles, and will close on 31st October, Section B is for competitors living outside the British Isles, and in order to give readers in distant lands time to prepare and forward their entries this section will remain open until 28th February 1947.

The following prizes will be awarded in each Section. First, Cheque for £2/2/–; Second, Cheque for £1/1/–; Third, P.O. for 10/6. There will be also ten prizes each consisting of a P.O. for 5/–. Certificates of Merit also will be awarded.



A fine model of a Diesel locomotive, built by P. R. Wickham, Countesthorpe, Leicester.

Club and Branch News

WITH THE SECRETARY

More than 10,000 Meccano boys have joined the Guild since January last. When Meccano Outfits re-appeared after the war I expressed the hope that new records would be created during 1946, and here indeed is a splendid start. There must be more to come. I look forward to receiving application forms from all newcomers to the hobby, and every member can do his share in ensuring record progress by persuading his friends who have not yet sent in their forms to do so as soon as possible.

On the Club front equally satisfactory progress is to be reported. This month again I include a good list of Proposed Clubs, and if I had room I should be able to add considerably to this. Those who wish to join a Club should not wait for announcements in the Magazine, but should write to me. I will then tell them whether a Club that they can join already exists or has been proposed.

REPORTS!

The Winter Sessions have now begun, and all that is wanted now in any Club or Branch is enthusiastic co-operation in the programme that has been planned. It is extremely important to keep in touch with all developments by means of regular reports. The value of the exchange of information that these provide is very high indeed, while by keeping in close touch with Headquarters Clubs can draw on the knowledge and experience of the Guild staff, accustomed for years to dealing with the little problems that continually arise in Club life.

RECENTLY INCORPORATED BRANCHES

490. Sheerness — Mr. L. Taylor, 18, Strode Crescent, Sheerness.
491. Evangelical Youth Centre (Ilkeston)—Mr. W. R. Leatherland, 286, Nottingham Road, Ilkeston.
492. Craigwell Branch—Mr. R. S. Evans, Two Orchard, Aldwick Bay, Bognor Regis, Sussex.
493. Widnes & District—Mr. T. Jones, 82, Farnworth Street, Widnes, Lancs.
494. Eastleigh County High School—Mr. C. A. Beck, The County High School, Eastleigh, Hants.
495. St. George's School, Amberley, Glos.—Mr. H. B. V. Bruton, St. George's School, Amberley.

PROPOSED CLUBS

Derby—Mr. L. Sims, 37, Grenfell Avenue, Off Stenson Road, Derby.
Bristol—Mr. B. W. Rowe, 7, St. Michael Park, Cotham, Bristol 2.
Eastleigh—L. Currell, 132, The Crescent, Eastleigh.
Leeds—P. Rose, 3, Balaclava Street, Beckett Street, Leeds 9.
Leicester—F. Haslum, 438, St. Saviour's Road, Leicester.
Sutton Coldfield—Mr. R. Gilliagham, 24, Kings Road, New Ascott, Sutton Coldfield.
Southport—J. Levy, 5, Saunders Street, Southport.
Farnborough—D. B. Eels, 99, Rectory Road, Farnborough, Hants.
London—Mr. E. F. Lane, 30, Guildford Road, Walthamstow, E.17.
Torquay—Mr. L. Folkard, 13, Shiphay Park Road, Torquay.
L. Thurrock—J. Brookes, 168, Heathview Road, L. Thurrock, Nr. Grays, Essex.
Stromness—Mr. D. S. Porteous, Hopedale, Stromness, Orkney.

CLUB NOTES

Stapleford M.C.—The summer programme has included Cycle Runs, Rambles and tracking expeditions. Clock making has been added to the list of activities, and Games have been played regularly. Club roll: 8. *Secretary:* P. R. Dennis, 36, Hickings Lane, Stapleford, Notts.

Winchmore Hill Collegiate School M.C.—All working parties, three for model-building and one for Hornby Railway operation, continue active. Preparations are being made for an Exhibition of models, with a firework display as an additional attraction. Wood trestles have been made for the model railway layout. Club roll: 22. *Secretary:* J. Bartholomew, Winchmore Hill, London N.21.

St. Oswald's M.C.—Regular meetings for the usual activities have been held. An interesting programme of talks has included one on "*Railways Around Croydon*," by Mr. Chapman, and another on "*Railway Freaks*" by Mr. B. Tatford. On Hornby Railway Nights many unusual operations have been carried out. Club roll: 35. *Secretary:* D. R. C. Pavey, 37, Croft Road, Green Lane, Norbury, London S.W.16.

Evangelical Youth Centre M.C.—During the summer an indoor meeting and a Visit were arranged for each month. Two particularly interesting Visits were paid to the Toton Yards of the L.M.S. and the Stanton coke ovens. The Annual Excursion was held in August. The programme for the period from September to December is now being drawn up. Club roll: 7. *Secretary:* M. Andrews, 9, Kingsway, Ilkeston.

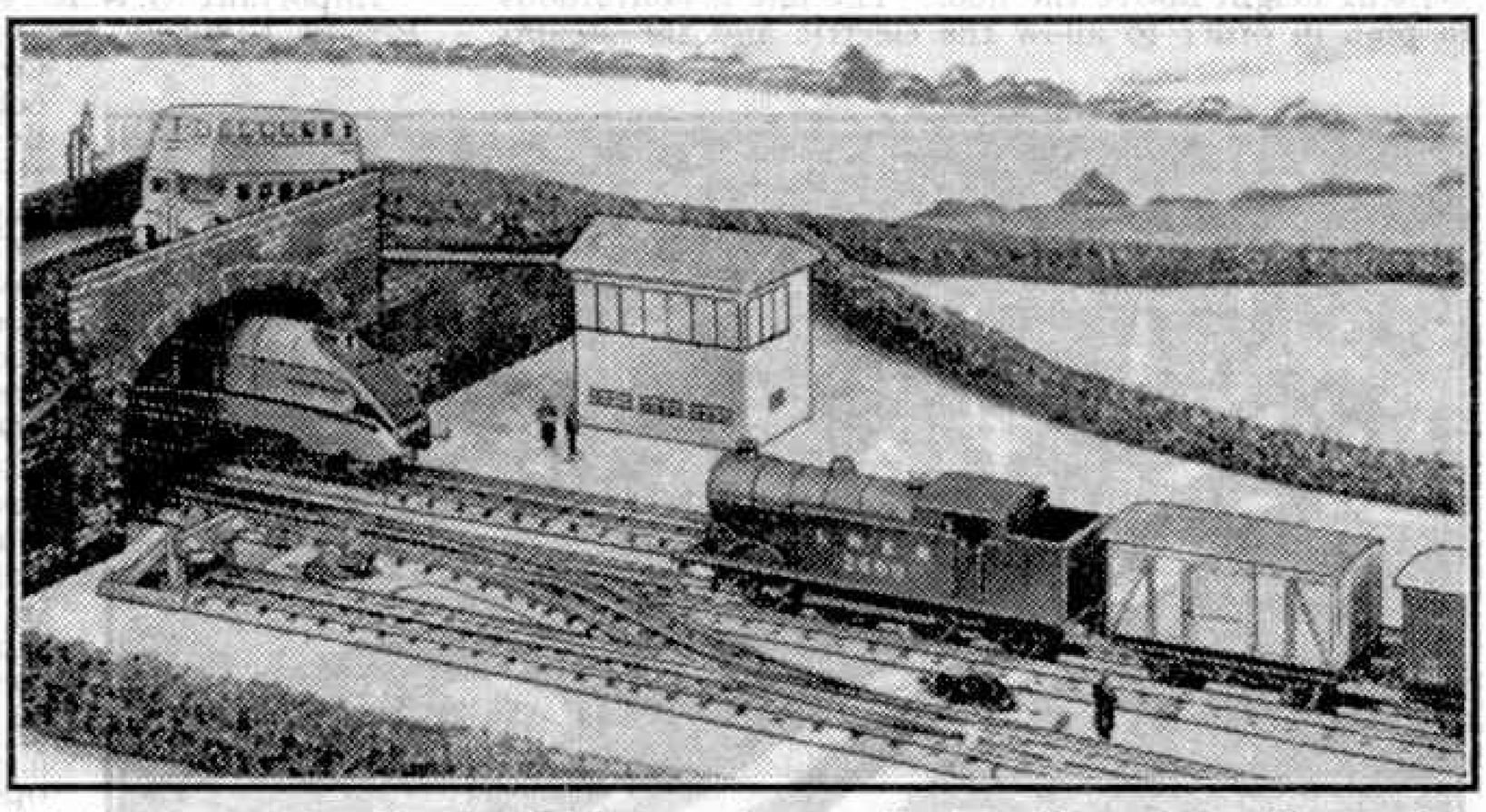
Officials and members of the Plymouth M.C. photographed during a Ramble to Kitt Hill. This enterprising club was affiliated in October 1926. Under the leadership of Mr. W. J. Ellis its members have established a splendid record in Model-building and many other hobbies and pursuits, some of them of a novel character, and have organised successful Exhibitions and Entertainments of various kinds.

Sidings and Loops in Hornby-Dublo

WITH the shortage of miniature railway equipment that has continued for the past few years most model railway owners will have discovered that an elaborate layout is not essential in order to carry out interesting train operations. Generally speaking, the bigger the layout the more fascinating things become, but the simple "main line and siding" type of system can afford plenty of entertainment, as we hope to show in the following notes.

A layout of any kind almost always starts as a simple oval track. This does not sound very exciting, but if we have even one station—a home-made one is better than none at all—we can with a little imagination work our train from point to point, although the same stopping place is used over and over again as the train proceeds on its journey. With a tank engine, "running round" the train at the end of the run in order to work the return trip is possible in the simplest way. The engine just uncouples from the end of the train and makes a circuit of the track to reach the other end and couple up again.

With an express engine it will be better to adopt "one-way" running only, whether the journey is supposed to be in the up or down direction, as tender-first working is unusual and we have no means of turning the engine round on the track. At the end of one run however the engine can be uncoupled and move away from the train. Then when all is ready for the next run it can come backing down again as if making a fresh journey. Simple as these operations are they can be quite interesting; a little "pretending" is necessary in any miniature railway working.



A train of vans on a Hornby-Dublo layout passes the loop line points. These points and the buffer stop spur are arranged as described on this page.

With the addition of points to the layout the working possibilities are greatly increased. With even a plain siding leading off the main line the layout begins to look more like a real railway. Hornby Dublo Points are so designed that they fit in correctly in relation to the other rails in any particular formation. The straight section of the points is in fact equal in length to a standard Dublo Straight Half Rail. Therefore if we cannot extend our oval layout lengthways when adding the points to one of the straight sides, we have to remove one of the complete rails and put in its place the points and a half rail to make up the correct length.

The curved section of Dublo Points is equal in radius and in length to a standard Dublo Curved Half Rail. Therefore to bring the siding parallel with the main line, as is desirable to obtain a neat and realistic effect and, indeed, usually necessary for reasons of space, we add a curved half rail to the branch of the points to form a reverse curve. This brings the siding parallel, and also brings the ends of the siding rails opposite to those on the main track. The special advantage of this is apparent later when we develop the plain siding into a loop line.

The way in which the siding fits into the operating scheme will depend on whether the points are laid "facing" or "trailing" to the normal direction of the trains. With "facing" points the trains travelling in their usual direction approach the movable switch rail ends of the points first; with "trailing" points the opposite applies, the trains then approaching the fixed ends of the points.

When the siding points are trailing to the main line, a train requiring to enter the siding will first run past the points and then, when the points have been moved, it will back into the siding. This leaves the train ready to move off again when required with the engine at the leading end. With facing points exactly the opposite applies; the train can run straight in but it will have to back out. Further, with this arrangement the engine is trapped at the inner end of the siding and cannot be released until the train has been moved away. It is possible to avoid this however by stopping the train before it reaches the siding points; then the engine runs round it as described earlier in this article, and so is able to push the train in. This leaves the engine free to move away.

Interesting variations are possible if we have two points, each of the same "hand," that is right-hand or left-hand. We can arrange them in the form of a crossover so that the straight section of the points lying in the siding can be extended in each direction. This will give us an arrangement similar to that shown in the illustration, though the extensions will be longer than the buffer stop "spur" shown. This scheme will enable trains working in either direction on the main line to set down or pick up vehicles at the siding. These vehicles should run next to the engine. To set them down the train stops before reaching the points and these wagons are uncoupled from the rest. With facing points the engine leads the wagons into the siding and then backs them into the spur now behind them; with trailing points the vehicles are simply backed in and left.

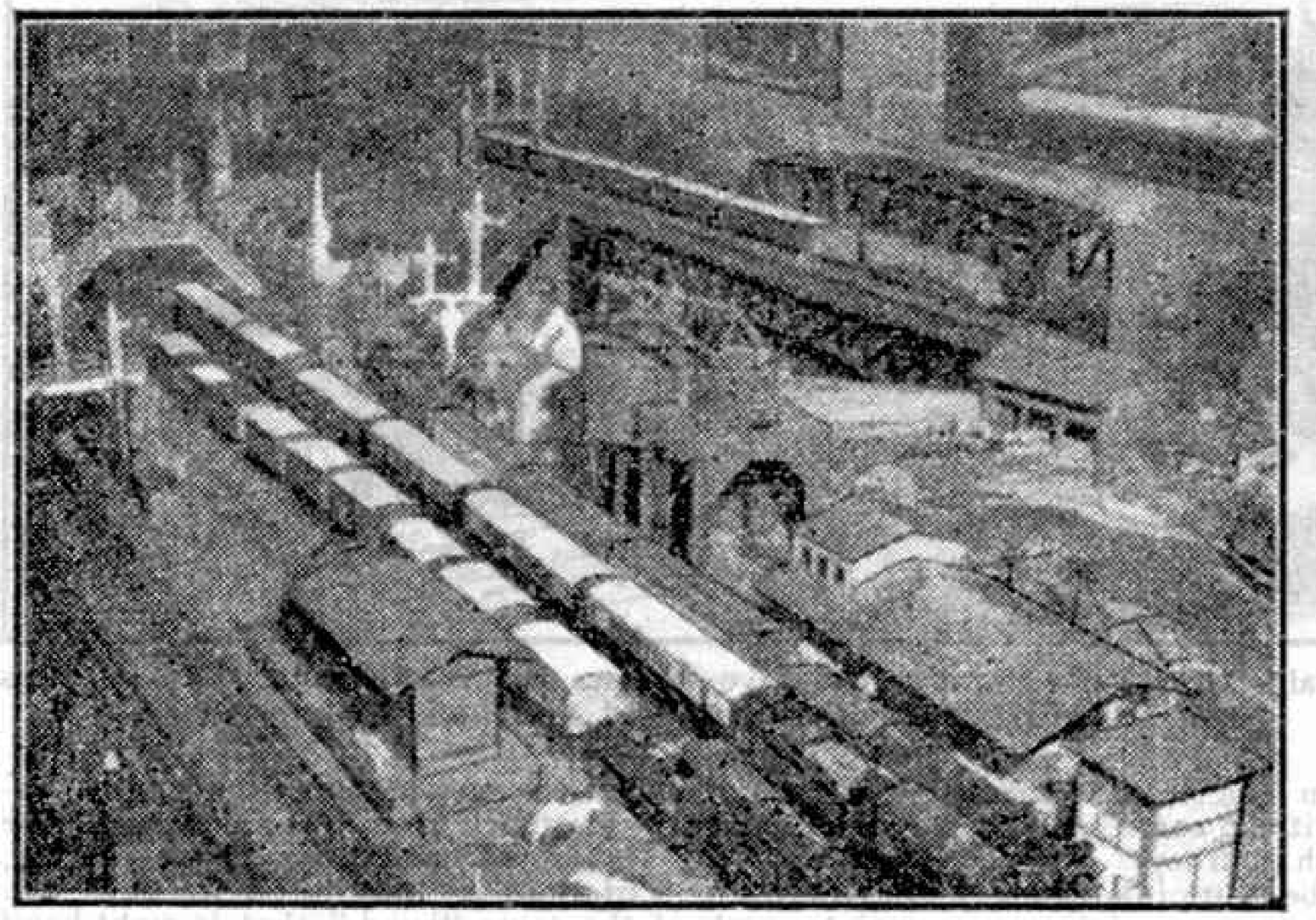
To form a loop line points of opposite "hands" are required, and each end of the loop is then formed in the same way as described previously for a simple siding. A loop line is a very useful addition to the system as a train can run straight into the loop from the main line without any of the shunting movements necessary with a dead end siding; and it can run straight out again at the opposite end. This applies no matter in which direction the train may be moving on the main line.

When a loop is used for "through" running in this way it is not convenient to leave odd vehicles there as they will be in the way. To provide for these therefore we can, if we have more points, extend one or both ends of the loop to form a buffer stop spur as in the illustration.

A Canadian Reader's Gauge 0 Layout

THE "*International Miniature Railway*," part of which is shown in the illustration on this page, is well named, for British, Canadian, American and French locomotives and stock are to be found on its metals. This remarkable Gauge O system is owned and operated by an "*M.M.*" reader, Mr. J. A. Markham of Ontario, Canada, who has prepared for the benefit of visitors to the layout an attractive little booklet from which the following details have been extracted. Few miniature railways can boast of their own publication.

The layout itself is permanently installed in that favourite place with North American model railroaders, the basement. The tracks are laid on a specially constructed baseboard raised to a convenient height above the floor. The line is continuous in plan in order to allow the electric and the steam-driven locomotives to perform to the best advantage. There also are several clockwork engines on the strength. The respective tracks for electric and steam traffic are separate, so that at the main terminal station there are also separate platforms for them. The clockwork engines can of course run on either section.



A view of the "International Miniature Railway" described on this page. This is owned and operated by our reader, Mr. John A. Markham, Ontario, Canada.

The electric lines are laid with Hornby Solid Steel Track and consist of a double road with a branch and various sidings. The steam section is laid with wood-sleepered track of the usual small-scale permanent way kind and there are sidings for steam trains as well. There are several passing stations served by both types of traffic, and the main terminus has six electric tracks under the one roof, and two steam tracks in their own separate section of the station. This arrangement makes for easy and convenient handling of each class of motive power, and is a help to the regular operation of train services.

The interest and effect of the system are enhanced considerably by the lineside features. These include engineering works such as tunnels and some quite imposing girder bridges. Natural scenery representing typical English rolling country, woodland and some marine views appear on a painted background. Between this and the actual tracks are numerous buildings, roads and so on, giving a nice effect of depth to the whole layout.

Train operations carried out for the benefit of visitors usually begin with the running of a miniature representation of the L.N.E.R. "*Flying Scotsman*" hauled by the well-known "Pacific" of the same name. The rival "*Royal Scot*" of the L.M.S. is run too, frequently made up of Hornby Corridor Coaches with correct name boards. One of the favourite engines for this and other L.M.S. services such as the "*Irish Mail*" and "*Night Scot*" is the splendid Hornby "*Princess Elizabeth*." This fine 4-6-2 is not, however, the only representative of the real "Class 7"; there is also the "Duchess" 4-6-2. With a "Royal Scot" 4-6-0 and one of the well-known Hornby 4-4-0 Standard Compounds the L.M.S. motive power on the layout reaches quite a high standard.

Important G.W.R. services such as the "*Cornish Riviera Limited*" are operated by means of Hornby Corridor Coaches in G.W.R. colours. Their brown and cream livery makes them most attractive, as the illustration on this page shows. The Hornby E220 "*County of Bedford*" is the favourite engine for these duties. Well-known all-Pullman trains such as the "*Golden Arrow*" of the S.R. and the L.N.E.R. "*Queen of Scots*" are operated also, and for these there are several Hornby No. 2 Special Pullmans. Various other S.R. non-Pullman trains are included in the programme so that the Hornby S.R. E420 "*Elon*" locomotive has plenty of work to do.

The remaining electrically-operated locomotives include French and Canadian models, the latter being adapted from engines of United States origin. Clockwork engines that are still in service, apart from the various "museum" locomotives that belong to the Markham collection, include a middle-aged Hornby "*Yorkshire*" L.N.E.R. 4-4-0 and a veteran of the earlier days of Hornby Trains, an old No. 2 4-4-0 in L.N.W.R. finish.

The steam-driven engines also take their share in regular operations, and are specially useful for long through runs. An L.M.S. 4-6-0 named "*Black Watch*" and an S.R. "Lord Nelson" are good performers. In addition a representative of C.P.R. practice takes the miniature Canadian "*Royal York*" Express. Freight traffic, steam-hauled, is dealt with by an L.M.S. 2-6-0, and the vehicles used include many Hornby types.

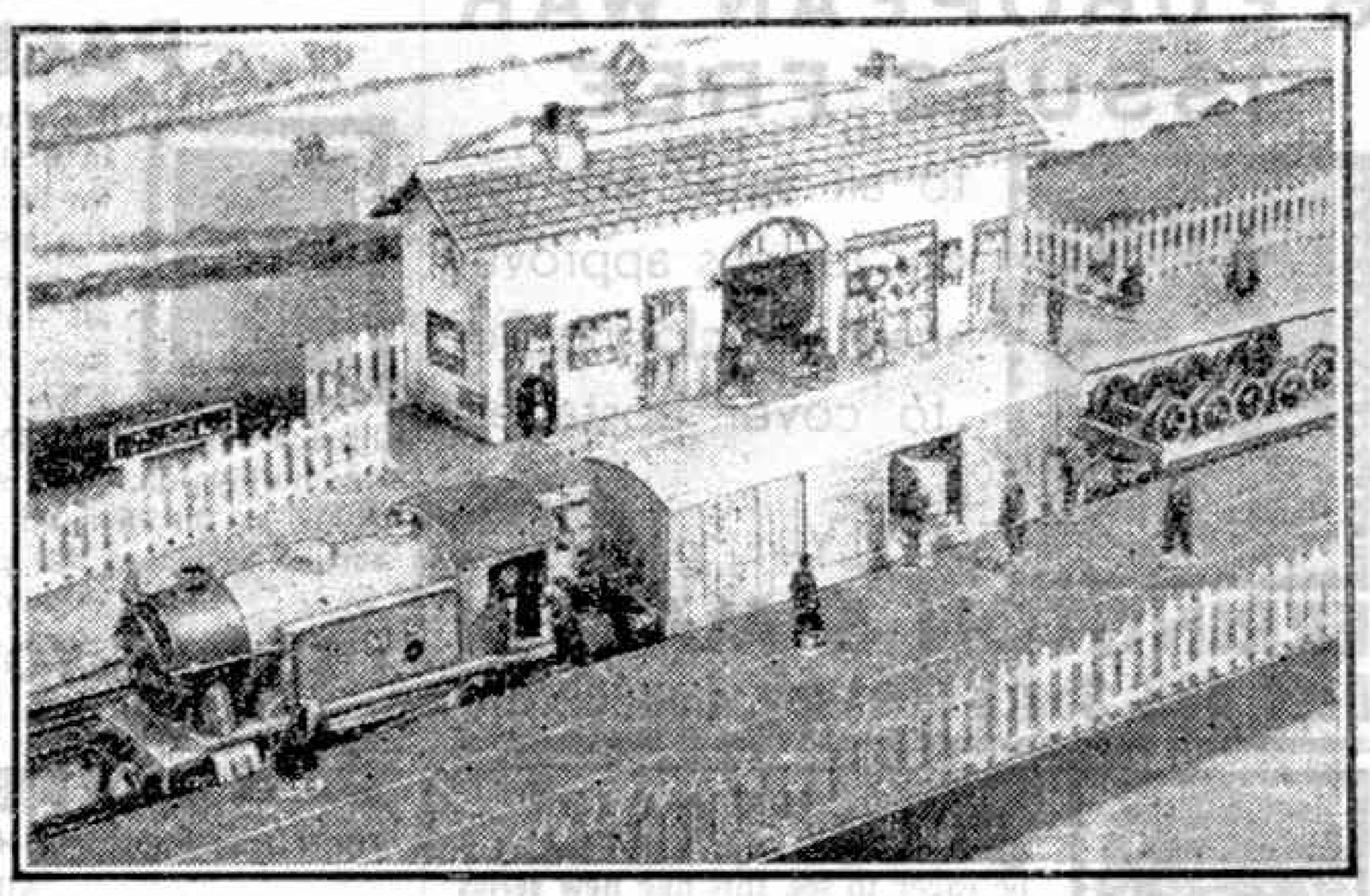
Signals, miniature road vehicles, road signs and miniature figures, both railwaymen and civilians, add to the realistic and lively effect of the railway and its surroundings. Many of the lineside components of this kind are Meccano Dinky Toys.

There are in addition models of historic interest, forming a sort of "museum" section to the railway, that normally do not take part in the running programme. Some of them in fact are unable to do so because of their scale, such as the two Gauge 1 representatives. One is a clockwork L.N.W.R. 4-4-0 similar to that illustrated on page 341 of the "*M.M.*" last August. The other is "only for show" and represents the "*Dorchester*," Canada's first locomotive, that was built in England in 1837. Other "period" representatives include a North British 0-4-0 and a Canadian 4-4-0 woodburner, with characteristic chimney. There is, too, a good representation of the first or small-boilered "Atlantic" of the G.N.R.

Special Traffic on Hornby Layouts

IN addition to the two main classes of traffic consisting respectively of passenger trains and goods trains, there are certain other trains that do not fall completely into either class. Prominent among the regular trains of this type are those that carry morning newspapers from London and other centres. They begin their runs in the small hours and are usually smartly timed, although they make several intermediate stops. This smart timing, together with the heavy loads, makes big engines necessary, so that it is quite in order for us to use a Hornby E220 Special or a No. 3 Locomotive on a train of this kind. Many of these trains are for newspapers only, but others include just a single coach for passengers. This results in a curious make-up for the train and this is specially noticeable when reproduced in miniature.

Ideal vehicles for a "newspaper train" on a Hornby layout are the No. 2 Luggage Vans. Their wide double doors make the actual loading of miniature bundles quite possible, a nice job for the junior members of the "staff." Such bundles can be made from narrow strips of real newspaper, folded and refolded to produce a miniature "bale" and tied up with cotton or strong fine thread. Miniature road vehicles too can be used very effectively for this and other types of traffic, in conjunction with the trains. With these and the platform loading operations we can capture something of the last-minute, bustling atmosphere that always precedes the departure of a "Newspaper." In addition to the No. 2 Luggage Vans the No. 1 Guard's Van is very suitable for inclusion in the train. If we have only one of these it should be used for preference as the last vehicle. It has lamp brackets and therefore can display correctly the tail lamp showing that the train is complete.



A "stores train" arrives at a Hornby Station. The No. 2 Luggage Van shown is ideal for use on this and various other trains as described in this article.

In running the train we should remember that complete van loads are often made up for particular intermediate stations, the vehicles concerned being detached at those points. Thus our train will become reduced in length by the time its run is over. Some trains make long through runs to distant centres where they are divided into their separate vans for different destinations. If we permit a few passengers to be conveyed we can include a brake composite No. 2 Corridor Coach.

Similar arrangements can be made for the running of parcel trains. These usually have no passenger accommodation, although they start their journeys at more reasonable times than the "Newspapers," but they often make various long stops on the way. Here again in addition to the actual running much fun is to be obtained from the loading and unloading of various consignments and from the transferring of certain items from one train to another at intermediate stations. Miniature luggage of one kind or another, such as seems to collect on most model railways, will do quite well. We can also make up various oddments of our own, such as small paper bundles tied up with cotton, miniature crates of wood or cardboard and similar items.

Milk trains too are among the "regulars." Some are composed completely of milk tank wagons, and a train of the Hornby Milk Tanks can look quite impressive. On most layouts however there will probably not be sufficient tank wagons available to make a complete train, but we can quite correctly combine both the tank wagons and milk vans in the one train. If we have no tanks at all, milk vans, or even luggage vans, can be run together with one or more of the ever-useful Hornby No. 1 Guard's Vans. Another scheme, if we cannot run a complete milk train, is to attach the tank wagon or van to a passenger train. Many consignments of such traffic regularly travel quite long distances in this way and in miniature the practice can be quite attractive. A milk tank or van running with one of our passenger trains adds to its interest while the attachment of extra vehicles at a wayside station provides some entertaining locomotive and track operations.

"Irregular" or special trains can be of various kinds according to the rolling stock that we have at our disposal. Certain traffics such as fruit are seasonal, while fish traffic is always liable to require special trains in addition to those regularly booked. There is therefore plenty of scope for the interesting use of any perishable or fish traffic vans that we may have.

So far we have dealt with traffic that our railway carries for its "customers." There are in actual practice numerous trains that have to be run so that a railway may carry on its business. There is for instance the stores train, little known except to the staff, that distributes to the different stations and depots the various requirements for their work. Such a train can be run now and again on a Hornby layout as a change from the normal operating routine. It can consist of one or two vans either of the No. 1 or No. 2 kind. A flat truck also is useful, and one of these is shown in the accompanying illustration loaded with several pairs of wheels. These are supposed to be on their way back to an out-station repair depot after attention at a main workshop. To complete the train a No. 1 Guard's Van should be used.

Trains of locomotive coal are often to be seen on the main lines, and the Hornby four-wheeled open Wagons are ideal for the purpose. In addition the No. 2 High-capacity Wagons can very well be used in a similar manner.

GRAND DISCOUNT APPROVALS!

These are REAL collector's approvals, with picked modern and new issues, obsolete and current G.VI, Coronations, etc., sent post free on request. General selections of Br. Colonials or Br. Cols. and Foreign available. 1d.–6d. per stamp or higher if required. Sets included. "Wants" lists for single stamps welcomed. We never send again unless you ask, so, for immediate and personal service, write NOW to

Postal Business Only

THE BIRKDALE STAMP CO. (P.T.S.)
104, LIVERPOOL ROAD, SOUTHPORT, Lancs.

LARGEST STAMP FREE!!

This MAGNIFICENT Postage stamp measures over **2 inches long by 1¼ inches wide** and is printed in 5 colours. It was issued by EQUADOR in 1938 to commemorate 150th **Anniv. of U.S.A. Constitution,** and portrays "LIBERTY" supporting Flag between Eagle and Condor. I will send it absolutely Free to all sending 3d. for postage and lists, and requesting my **Famous Discount Approvals** which will surprise you. Write at once to:—

G. L. WRIGHT (formerly H. C. Watkins), Dept. E, 29, Palace St., CANTERBURY, Kent

6 EUROPEAN WAR ISSUES FREE

to all applicants for our famous approval sheets enclosing 3d. to cover postage.

APPLY–

ERRINGTON & MARTIN
Dept. 430, South Hackney, London E.9

"MERCURY MAJOR"

● **Serious Medium Collectors** will be eager to see this fine **new series** of **British Colonial Approvals,** ranging from **Q.V. "Classics"** to **K.G.VI Pictorials.** The usual fine "Mercury" quality! ● Please send 3d. for postage and list, and ask for **"Mercury Major"** Approvals, stating your needs.

Philip J. Dyke (P.T.S.), 35, Buckleigh Ave., London S.W.20

Roosevelt, The Philatelist ★ FREE!

Purely to introduce our Approvals to new collectors we offer QUITE FREE the latest issue from Nicaragua showing President Roosevelt with magnifying glass and one of his albums. Please send 2½d. to cover postage and we will forward this stamp, together with a fine selection of stamps priced from ½d. upwards on approval. Write to:

CAPT. M. CAMPBELL & CO. (Dept. MM)
58, High Street, Watford, Herts.

APPROVAL BOOKS

containing low and medium priced Colonial and Foreign stamps still sent to applicants. Good discount and a list of 90 FREE GIFTS varying in value according to money sent for purchases. These gifts can be chosen by you from this list which contains King George VI, Jubilees, Free French, ALL the Coronation Sets Mint, etc., 3d. stamp please.

C. A. RUSH, 38, Queen's Avenue, Whetstone, London N.20

THE MARSHAL PETAIN PACKET FREE

Marshal Petain, hero of VERDUN in first World War and now prisoner for life for his treachery to FRANCE in the last war. His philatelic portrait is included in this FREE PACKET of all different stamps. There are also fine British Colonials and such as KENYA (unused) India and Australia, French Colonials REUNION (mint), overprinted issues, Czechoslovakia, map stamps and pictorials. SEND NOW as the demand for this wonderful offer will be terrific. Enclose 3d. postage and request our World-famous Approvals.

LISBURN & TOWNSEND LTD. (MM)
41, NORTON STREET, LIVERPOOL 3

BARNET & FORD

The Stamp Shop, 5b, High Street, CONWAY, N. Wales

All mint sets:

MALAYA, B.M.A. 1c. 15c. (Red o/p), 2/6.
S. RHODESIA, Golden Jubilee, 8 vals. 1/2—1/–, 4/6.
NYASALAND, 1942 George VI (Leopards) 1/2—3d., 1/3.
BELGIUM, 4 Resistance CHARITIES (large Pictorials), 2/–.
ITALY. New Colours, 50c.: 15L: 30L. (Pictorials), 2/6.

MINT SETS to 3d. Ascension, Gambia, Gibraltar, or Pitcairn 1/– per set ea. Br. Sol. Is., Fiji or Gilberts 1/2 per set ea. Malta 1/3, postage 2½d.—B. Purcell, 22, Green Lane, Amersham, Bucks.

FREE! STAMP COLLECTORS

Send 2½d. postage for this obsolete stamp of

HITLER

Limited Supply and only one to each applicant.

G. KEEF
Willingdon, EASTBOURNE

For other Stamp Advertisements see also pages 432 and vii.

Stamp Collecting

The Australian Commonwealth

By F. Riley, B.Sc.

THE kangaroo stamp that inaugurated the stamp history of the Australian Commonwealth was soon followed by more exciting pictorial efforts. It was issued in January 1913, and in the following December there came two new designs, a 1d. red bearing a portrait of King George V, flanked by a kangaroo and an emu respectively, and a 6d. claret, the chief feature in the design of which was a kookaburra. The kookaburra is the laughing jackass, the call of which resembles a harsh human laugh. It seems to find much grim fun in the world, for it continually disturbs the quiet of the Australian bush with its mocking screech.

The kookaburra reappeared on the 6d. stamp of the 1937 pictorial issue, in which it was accompanied by the lyre bird, the koala bear and the duck-billed platypus as well as the kangaroo. In the meantime it had figured in a special issue of 1932. Australia's wild life is indeed unique. The koala bear, a teddy bear in real life, is one of the most attractive of creatures. The emu is a splendid example of a flightless bird, but perhaps of all the creatures shown on Australian stamps the most remarkable is the duck-billed platypus, which figured on the 9d. value of the 1937 issue. This creature lives only in Australia and Tasmania. It is something like an otter, but has a bill resembling that of a duck and its feet are webbed, while it is provided with claws with which it can burrow its way into the banks of the stream in which it finds its food. Most remarkable of all, it lays eggs and has a pouch.

Another animal that has figured very prominently in Australian history is the merino sheep, and this too has been pictured on Commonwealth stamps. In 1934 a stamp was issued in celebration of the centenary of its introduction into Australia, by Captain John Macarthur. This was the beginning of what came to be the greatest of Australian industries, for the sheep flourished on the downs in New South Wales and in other parts of the country, and Australian wool, the finest in the world, finer than any dreamed of a century ago, has been exported in enormous quantities for spinning and weaving into the first-class cloth for which the woollen areas of Great Britain are now famous.

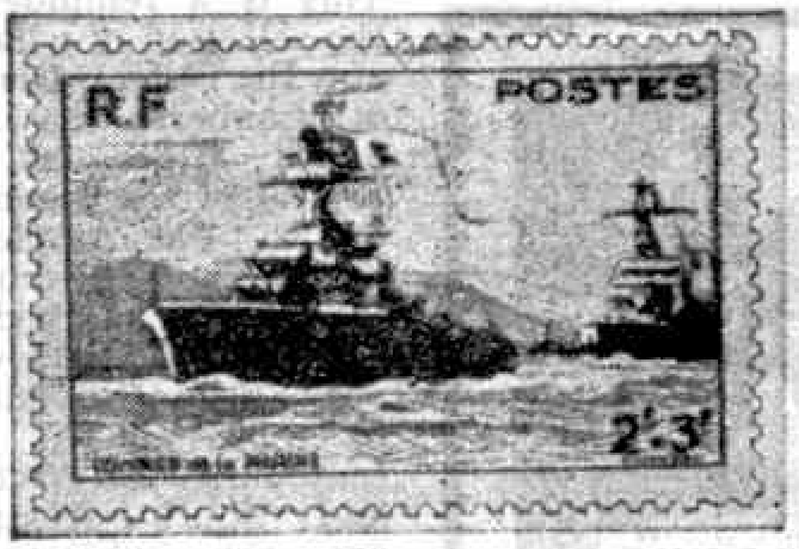
From 1913 down to the present day many commemorative Australian stamps have celebrated outstanding events in the stories of the Commonwealth and of the States that preceded federation. For instance, the opening of Parliament House at Canberra was the occasion of the issue of a special stamp.

This is a reminder of the selection of what is now the Federal District of Canberra in New South Wales, as the capital of the Commonwealth. The completion of Sydney Harbour Bridge was marked by the issue in 1932 of a very attractive stamp in three values. The centenaries of Victoria and South Australia are the subjects of other attractive issues, while in 1937 there came a stamp that marked the 150th anniversary of the foundation of New South Wales in 1788. This stamp shows Governor Philip at Sydney Cove when he landed there to become Governor of the new colony. Western Australia's centenary was celebrated in 1929 by the issue of a stamp, illustrated last month, that appropriately bore the famous black swan, another of Australia's remarkable wild creatures, which provided the central feature of Western Australian stamps for many years.

Naturally the two World Wars have left their mark on Australia's stamp story. The "Anzac" commemoration stamp of 1935, marking the 20th anniversary of the landing of the Australian and New Zealand Army corps at Gallipoli, shows the cenotaph at Whitehall; and the design selected for the Silver Jubilee issue of 1935 shows King George V on *"Anzac,"* a gift to him from the people of the Commonwealth. The present war brought with it first the splendid Australian Imperial Forces issue, in four values, 1d. to 6d. The design of this fine stamp shows representatives of the Australian Navy, Army and Air Force, with a nurse to provide a background. More recently an issue of peace stamps has appeared, three in number. These were referred to in the April *"M.M."*

Along with the stamps to which I have made a brief reference there have been other fine portrait stamps of Queen Elizabeth as well as King George V and King George VI, and of the Duke and Duchess of Gloucester. Explorers too have appeared on Commonwealth stamps. The first to be commemorated in this way was Captain Sturt, who discovered the Darling and followed the course of this river and the Murrumbidgee to their junction with the Murray, and later penetrated to the centre of the great island continent. The centenary of the explorations of Sir Thomas Mitchell in Central Queensland have recently been marked by the issue of three stamps.

It will be seen that there is a wealth of interest in Australia's stamps. There are sure to be more attractive issues, and the country is worthy of the attention of all collectors.



WARSHIPS STAMP FREE

This fine stamp as illustrated has just been issued by **FRANCE** in honour of the French Navy. Its handsome design shows two of the latest French Battleships at sea on manœuvres. It is a most attractive stamp which every philatelist will want for his collection, and is already scarce. We have managed to obtain a number of these stamps and offer one to **YOU—ABSOLUTELY FREE,** to add to **your** collection. We will also send you a nice selection of stamps on approval. You must write to us and ask for Warships Stamp Free and approvals, and must send 3d. in stamps for our postage. Write now and obtain this magnificent stamp **FREE.**

WINDSOR STAMP CO. (Dept. M), Uckfield, Sussex

OUROWNSTAMPS

Why not take up a new group of stamps? Our own Commonwealth stamps of the **present reign** are unique in as much as they yield **profit** as well as **pleasure.** Our stock of K.G.VI stamps is the most comprehensive in this country or any other. Our price list for a whole year (with interesting notes) costs only 2/-.

THE COMMONWEALTH STAMP COY.
21, CUMBERLAND STREET, LIVERPOOL 1

	Mint	Used
CANADA. 13c. Ottawa Conference	—	1/2
CYPRUS. K.G.VI 1938 set of 7 vals. to 2½ p. (incl. obs.)	—	3/-
GT. BRITAIN. 1940 Cent. ½d.—3d. ..	4/-	1/3
ST. LUCIA or ST. VINCENT, ½d.—3d., 6 vals.	—	1/9
S. RHODESIA, K.G.VI, ½d.—1/-, 8 vals. ..	—	1/11
S. RHODESIA, Victory Set	1/8	2/3

Postage extra. Want lists filled. Bulletin 1/- per annum. Approvals on request. Please state interests.

IVAN GRAY & Co., 76, University Avenue, Belfast

N.Z. VICTORY STAMPS

A fine unused set of New Zealand Victory stamps showing Lake Mathieson, King Geo. VI and Parliament, and St. Paul's Cathedral with the Union Jack in the background, a quotation from one of Mr. Churchill's great Battle of Britain speeches, and the V sign, designs truly symbolising the sources of Peace, Strength, and Victory, sent free to all applicants for approvals enclosing 2½d. postage.

R. D. HARRISON, ROYDON, WARE

FREE—STAMPS CATALOGUED 5/-
to applicants for ½d. approvals.
COX, 17, STONELEIGH PARK ROAD, EWELL

THE FIRST STAMP EVER ISSUED

(British 1840 Penny Black) for P.O. 7/9! It is guaranteed genuine in every respect. (Better-grade copies also available at 10/6, 15/6 and 20/- respectively). Its companion stamp (1840 2d. blue) nice used at 13/9 (better grade at 18/6, 27/6 and 35/- respectively). Other "Classics" which every collector should have are the **CAPE OF GOOD HOPE TRIANGULARS**; we offer 1d. rose (cat. 60/-) at 22/6; 1d. brown-red (cat. 70/-) at 25/-; 4d. blue (cat. 30/-) at 11/6; 6d. pale lilac (cat. 65/-) at 25/-; 1/- yellow-green (cat. £6) at 40/-; 1/- deep dark green (cat. £6) at 47/6; and 1/- emerald-green (cat. £9) at 60/-.

SUPERB APPROVALS (general, or by countries for really serious collectors and specialists) against approved English references or a deposit.

CURRENT PRICE LIST 1D. POST FREE.

NORRIS & CO. (Dept. MM)
21, AUCKLAND ROAD, NORWOOD, LONDON S.E.19
(Recently of SOMERCOTES, DERBY, but now returned to pre-war London address).

Low Values of INDIA S.G. **SIMPLIFIED** Cat. Numbers Mint marked *. Postage Please.
1d. ea. 9, 24, 26, 28, 36*, 36, 38, 39*, 48, 49, 50, 51, 65, 66, 67, 68, 69, 70, 71, 76, 79, 80, 82, 83, 85, 107, 108, 109, 110, 121, 122, 123, 124, 141, 142, 143, O19, O20, O21, O22, O23, O29, O30, O31, O32, O33, O34, O43*, O43, O44, O35, O46, O47, O48, O50, O70, O71, O72, O73, O76, O77, O78, O83*, O83, O84, O85, O86. **2d. ea.** 10, 65, 7-, 86, 87, 112, 116, 117, 126, 127, 132, 144, 146, 147, 148, 149, 152, O13, O35, O48, O52, O74, O84*, O84A, O85*, O87, O87A, O90, O91. **3d. ea.** 29, 53, 81, 103, 111A, 128, 130, 135, 143A, 145, O14, O24, O25, O28, O37, O48A, O54, O67, O73*, O75, O79, O82*, O82, O86*, O88. **4d. ea.** 30, 37, 40, 47*, 52, 54, 72, 78, 94, 102, 113, 114, 115, 131, 132, 150, 151, O6, O18*, O18, O26, O36, O53, O88*. **6d. ea.** 18, 41, 74, 84, 88, 93, 133, 136, O3, O4, O27, O60, O66, O67*, O68, O69. **9d. ea.** 12, 19, 32, 43, 56, 58, 101, 129, 133, O1, O7, O51, O66*, O69*, O80, O89. **1/- ea.** 27, 35, 95, 111, 118, O16, O38. **1/3 ea.** 13, 25*, 25, 97, 104, O55.
Please send me your "Wants" List for other India items. India Pkts., 50 diff., **2/6;** 100 diff., **5/-;** 125 diff., **10/-.**
F. Harlow, B.P.A., 133, Bradbourne Vale, Sevenoaks, Kent
'Phone: Sevenoaks 2742 Bankers: Barclays Ltd.

STAMP COLLECTORS OPEN YOUR ALBUMS

and ask me to send you some single Stamps and cheap sets on Approval. I am giving 25 stamps, including **N. Zealand Peace, ½d. St. Kitts, 2c. Trinidad, S. Rhodesia, Newfoundland,** etc., to all applicants for approvals.
Without approvals, price 9d.
FLEMING, NEWHAVEN, GLYN AV., COLWYN BAY

WHILE STOCKS LAST!!

Complete 49 Sets PEACE Crown Colonials and States (100 stamps) and SPECIAL PRESENTATION VICTORY AND PEACE COMMEMORATIVE STAMP ALBUM 10"x8"—exact stamp size spaces and values above—coloured card covers for the entire 168 stamp collection, 27/6 only (or 5—5/- stamp lots and 3/- extra postages). Only readers who booked orders from past advertisements can obtain the Album for 2/6.
The Western Imperial Stamp Co., Trowbridge, Wilts.

FREE "WORTH WHILE" OFFER
10 U.S.A. AIR MAILS AND COMMEMORATIVES
Free to all applicants who send 2½d. for postage and ask to see a selection of my "WORTH WHILE" approval sheets. You will be pleased, I know.
JOS. H. GAZE, 10, Pimlico Road, CLITHEROE, Lancs.

HALF PRICE APPROVALS

We are offering until further notice special books of GREAT BRITAIN and BRITISH COLONIALS including CORONATIONS.

at 50% DISCOUNT

Minimum purchase, 10/- worth for 5/- net.
Send stamp for trial selection.
SAUNDERS & CO., 8, Hawthorne Ave., KENTON, Mdx.

For other Stamp Advertisements see also pages 430 and vii.

Stamp Gossip

and Notes on New Issues

By F. E. Metcalfe

WE cannot get away from "Victory" or "Peace" stamps, as some of the Post Offices choose to call them; few governments will be able to resist the easy money they can obtain from the millions of collectors up and down the world by issuing these stamps, but none are causing as much stir as those issued for our own colonies, one of which we are illustrating this month.

Fiji was the first of the Crown Colonies to issue its pair, followed by Gambia. The design, common to all of them, except Hong Kong, is a sound professional job of work, and though hardly inspiring it is at least an improvement on the designs selected by Jamaica for its commemorative set. Incidentally this latter set went off sale on 19th August after a year of life. So unpopular was the set amongst collectors that many never bothered to buy one at all; but make no mistake about it, one day they will suddenly discover that they want to buy. Then the price will move up, so this month we are making this set our tip. Buy the Jamaica "Constitution" set just as soon as you can, that is of course if you collect the country in question.

One of the nicest stamps which the U.S.A. has issued for a long time is the 3c. blue commemorative issued in honour of the Iowa State Centenary. This dark blue stamp is a pleasant change from the puce stamps America has been turning out so regularly for the past few years. Few foreign stamps are more popular with British collectors than U.S.A. commemoratives, but again it is going to be difficult to obtain such stamps mint, for the Board of Trade has stopped all barter.

The present legal position about the importation of stamps may be of interest to readers of this page. They may send stamps to people residing in the British Empire, except Newfoundland and Canada. These countries are out owing to the fact that their currency is linked with dollars and not sterling. They may receive stamps in return, again with the exception of Canada and Newfoundland, but this is not permitted outside the Empire, though presumably they may still receive foreign stamps as gifts. For some time dealers have been able to "swop" outside the Empire, and so they were able to supply their customers with new issues, such as the American commemorative stamps, but that's all finished now.

The reason for this? Well, mint colonial stamps were being used as barter for the stamps which were imported, and as some dealers were making anything but good swops, foreigners in places like Switzerland were able to sell British colonial stamps under face value, and that of course was losing this country good exchange. So the Board of Trade put up the barriers. They probably did the right thing, but what has happened hasn't been altogether a bad thing, for American dealers, having good stocks of colonial stamps to sell through their barter deals, have pushed their stocks hard and thousands of new collectors have taken up our colonial stamps. Many of these will want the new issues as they come out and these will have to be purchased; another point is that only current stamps were used for barter deals and American collectors have been reaching out for those which are obsolete. This has resulted in these stamps rising higher in price over there than they are here. Compared with the number of collectors of K.G.VI stamps in the rest of the world, or even in Great Britain, the U.S.A. batch don't amount to very much. Still the more the merrier.

No doubt many readers got hold of a few used copies of the 3d. "Peace" stamp of Great Britain. These are worth holding on to if nicely cancelled. They will never be rare, but as time goes on they will be nice little stamps.

France continues to turn out superb stamps, and the air stamp we are illustrating is no exception; but they are undoubtedly overdoing it, and one day collectors are going to get tired of too many stamps. Loss of sales will result, as has happened in the past, notably with Italy. Actually these stamps have never recovered their one time popularity.

Another country which is turning out far too many stamps is Monaco, but it is difficult to resist this country's issues, so beautiful are some of them. The latest is a quaint affair, issued to commemorate the day of the stamp, whatever that may be.

We could have illustrated this month another stamp which has just arrived from America; a 3c. commemorative issued in honour of the centenary of the Smithsonian Institute, Washington. An Englishman was the founder of this and its chief interest to stamp collectors is that it houses, or did so until recently, the world's rarest stamp, the famous British Guiana item. Anyhow one U.S.A. stamp is enough for one month, so we will leave it at that. Incidentally this latest American effort is printed in a pleasing shade of plum, so apparently the postal authorities have abandoned the various shades of puce for their special stamps, and not before it was time.

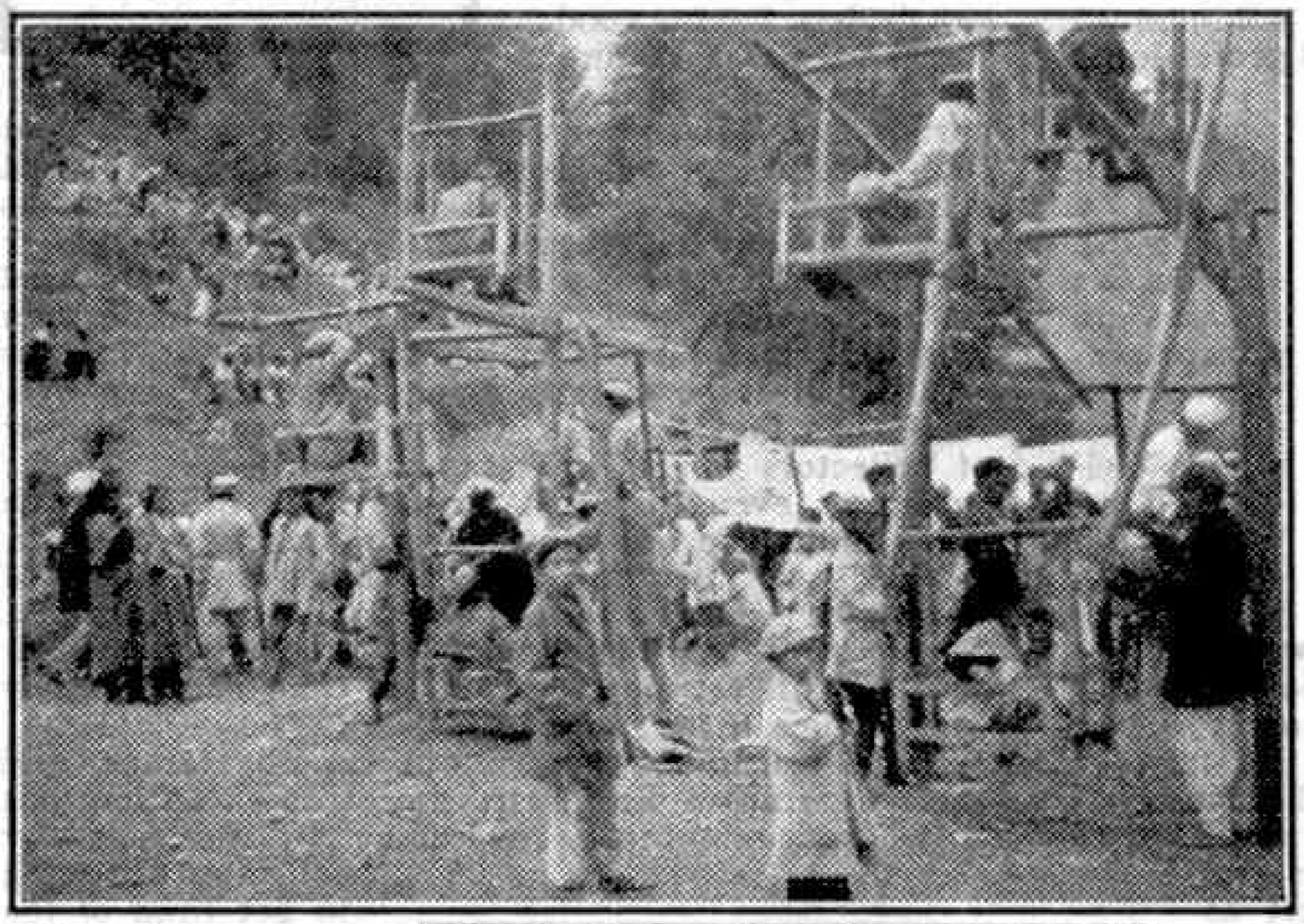
The new Canadian "Peace" stamps are announced for the middle of September, and Southern Rhodesia's set will appear in October. A surprising piece of news is that Newfoundland is not to have a "Peace" or "Victory" set. We wonder what is the motive behind this. Newfoundland has always been more than willing to bring out a new set of stamps, with or without real justification.

From Our Readers

This page is reserved for articles from our readers. Contributions not exceeding 500 words in length are invited on any subject of which the writer has special knowledge or experience. These should be written neatly on one side of the paper only, and should be accompanied if possible by original photographs for use as illustrations. Articles published will be paid for. Statements in articles submitted are accepted as being sent in good faith, but the Editor takes no responsibility for their accuracy.

A PRIMITIVE FAIR IN INDIA

During the summer months fun fairs are in full swing in all parts of Great Britain, ranging in size from that on the South Shore at Blackpool down to the modest little travelling fairs that visit the country towns and villages. All of us, young and old, find it difficult to resist the roundabouts and swings, but I wonder how many of us have given fairs in general a second thought. They travel the countryside in summer only, staying a week in one town and a few days in another, and I think we must look back a few hundred years to see how they originated.



Village fair scene in the Kulu Valley of Northern India. Photograph by F. L. Newall, Broadchalke.

In ancient times, when England was mostly a farming community, the peasants had little work to do while the corn was ripening. They wanted relaxation in or near their villages, for they did not travel so far afield as we do nowadays. And so the travelling fair, with its juggler, performing animals and sweetmeat stalls provided their simple amusements.

There must be few places where the village fair is still held in its most primitive form, but while travelling in the Kulu Hills to the north of Simla in Northern India I came across several that gave me a very good idea of what the village fairs in this country probably were like years ago. There, in Kulu, while the maize is ripening in the hot summer sunshine, the annual village fairs are held. These are partly of a religious character and take place in the village temple glade among magnificent deodar trees. Traders' stalls are set up, and the hill folk exchange their homespun cloths for luxuries brought up by the merchants from the plains. The most popular side-show of the whole fair is a wooden joy-wheel of the type shown in the accompanying photograph, which is turned around by hand.

F. L. Newall (Broadchalke).

CARISBROOKE CASTLE

The quaint old buildings in the main street of the village of Carisbrooke, in the Isle of Wight, blend harmoniously with the countryside around, and a picturesque lane with a beautiful water splash and a steep climb up a grassy slope bring one to the castle, which is one of the most magnificent in the South of England.

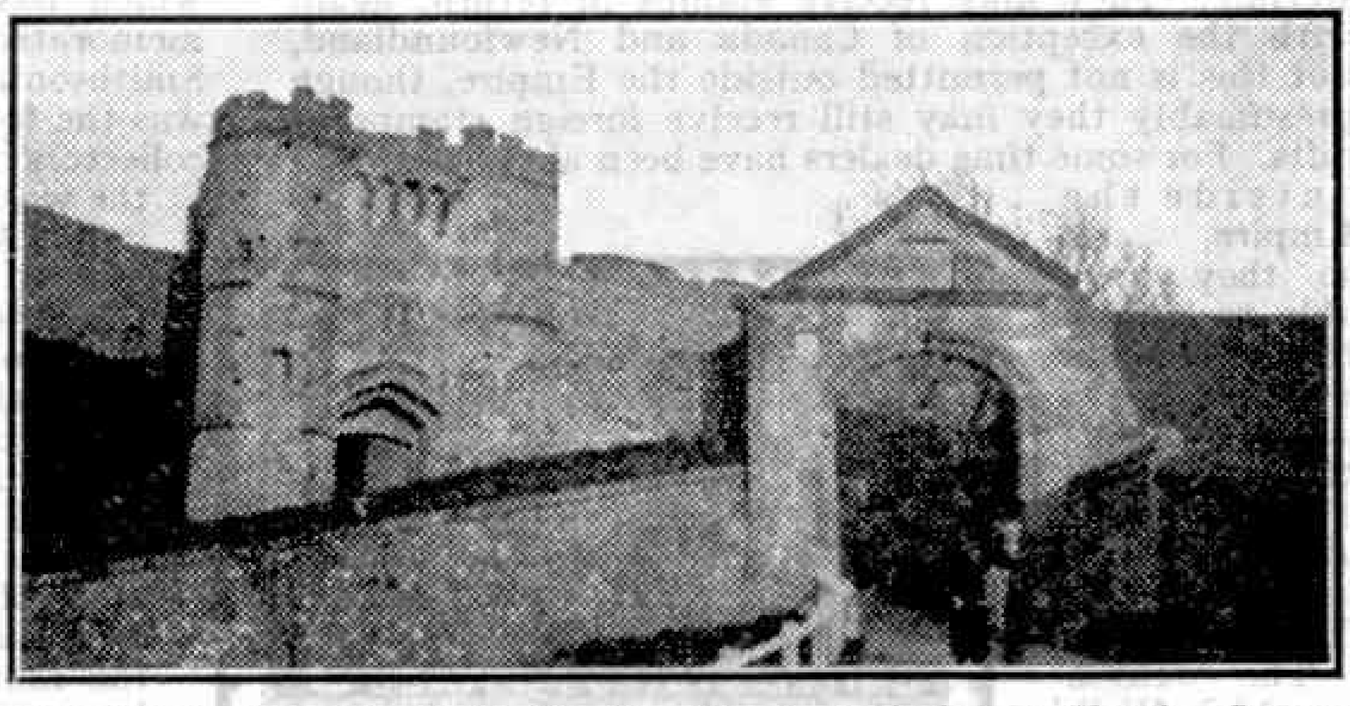
A fort stood on the elevated site in Roman times and some of the walls of this have been unearthed, but the existing building dates from Norman times. Although the ancient kitchens and living quarters have fallen into ruin, much remains intact, or nearly so, such as a complete circuit of massive walls, a fine example of a circular keep on a lofty mound, and the imposing gateway.

The castle has always been the seat of the Governors of the Island from the times of the great Norman barons, who were known as Captains of Vectis, from the ancient name of the Isle of Wight. Its stout walls had to withstand many a siege, particularly from French marauders, who repeatedly attacked the Island, sacking its villages and ports. Later King Charles I was imprisoned here prior to his execution. A bowling green that still exists was laid out for his benefit, and high up in the thick wall above the moat is a window from which he once tried to escape.

The room in which the king was confined has fallen into ruin. Elizabeth, his daughter, died of fever in the Castle, and was buried in Newport Parish Church. She was the last member of his own family that the doomed king ever saw.

Nowadays the castle is occasionally used by the Governor, who resides in more modern buildings in the Castle yard. The room over the massive gateway is used as a museum and contains many interesting relics of the castle's great past. In the centre of the yard is the well house, in which a donkey draws up water by treading a creaking wooden wheel, an animal treadmill.

P. Norris (Cowes).

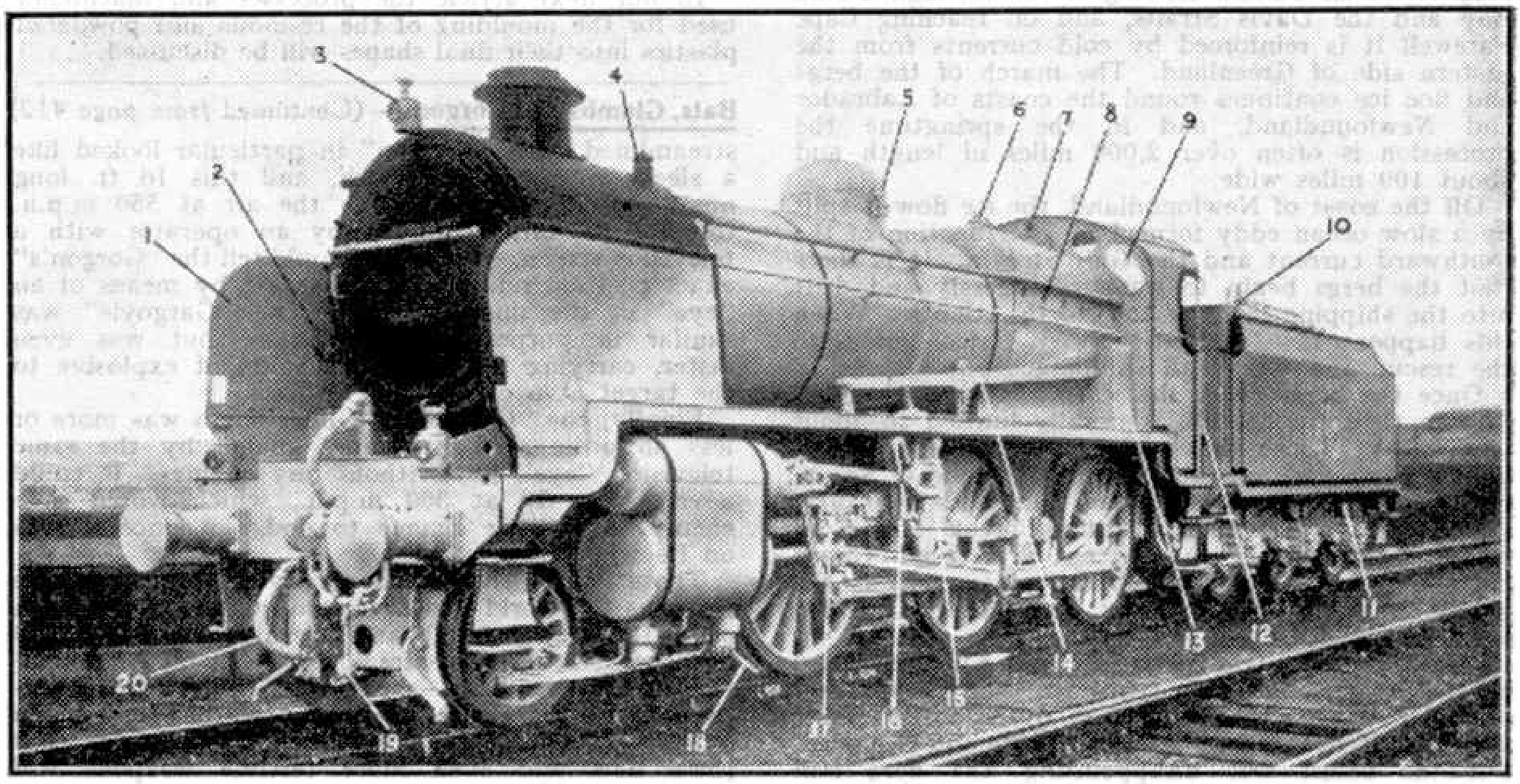


The front of Carisbrooke Castle. Photograph by P. Norris, Cowes, Isle of Wight.

Competitions! Open To All Readers

Prize-winning entries in "M.M." competitions become the property of Meccano Ltd. Unsuccessful entries in photographic, drawing and similar contests will be returned if suitable stamped addressed envelopes or wrappers are enclosed with them.

Do You Recognise These Locomotive Parts?



The photograph reproduced on this page shows one of the familiar "N" class 2-6-0s of the S.R. and various parts are indicated by numbers. In our chief competition this month competitors are required to name these parts and state their purposes. A short explanatory note will be sufficient.

Entries should have the parts in their numerical order and should be on one side of the paper only, and each must bear the name, age and full address of the competitor.

As usual there will be two sections, for Home and Overseas readers respectively, and in each there will be prizes of 21/–, 15/– and 10/6 for the best entries in order of merit, with consolation prizes for other deserving efforts. Ties will be decided on neatness and originality.

Entries must be addressed *"October Locomotive Parts Contest, Meccano Magazine, Binns Road, Liverpool 13"* and must be posted to reach this office on or before 30th November. Overseas closing date 31st May 1947.

Engineering Drawing Contest

It is some time since we offered readers an opportunity of displaying their skill in drawing, so for this month we have arranged a contest of this type. In it there is a wide choice of subjects, for competitors are asked to send in drawings of **any engineering structure or machine that has aroused their interest.** Wherever they have gone during their summer rambles they will have seen cranes, overhead conveyors, harvesters and similar machines, and will have watched them at work, and drawings of these are what is required in this competition. Transport subjects such as buses, lorries and motor cars are excluded, unless these have been built with some special purpose and incorporate additional interesting mechanisms. Thus a bulldozer at work would be a suitable subject, while a tractor would not. Drawings may be coloured if desired.

As usual in these competitions there will be separate competitions for Home and Overseas readers, and in each of these there will be two sections, A for competitors of 16 years of age, and B for those under 16. Prizes of 21/–, 15/– and 10/6 will be awarded. Entries should bear the sender's name, full postal address and age on the back. Competitors are particularly requested not to put their names on a separate sheet of paper.

Envelopes containing entries should be addressed *"October Drawing Contest, Meccano Magazine, Binns Road, Liverpool 13,"* Closing dates: 30th November in the Home Section and 31st May 1947 Overseas.

October Photographic Contest

As usual, prizes are offered for the best photographs of any kind. Each photograph must have been taken by the competitor, and on the back of the print must be stated exactly what the photograph represents.

There will be two Home sections, A (16 and over) and B (under 16), and two similar sections for Overseas. Entries should be addressed: *"October Photographic Contest, Meccano Magazine, Binns Road, Liverpool 13."* In each section prizes of 15/- and 7/6 will be awarded. Closing dates: Home, 31st October; Overseas, 31st March 1947.

Icebergs Ahead!—(*Continued from page 399*)

of long sinuous glaciers which have worked their way to the coast from the icy mountains, and it is estimated that the amount of ice flow from Greenland alone is more than 2,000,000,000 cu. ft. Sailors call it "The White Peril."

The majority of bergs begin their sea journey from north-western Greenland, entering Baffin Bay above Disco Island, and are carried southward by what is called the Labrador Current. This current starts as a long ice-laden stream flowing down through Baffin Bay and the Davis Straits, and on reaching Cape Farewell it is reinforced by cold currents from the eastern side of Greenland. The march of the bergs and floe ice continues round the coasts of Labrador and Newfoundland, and in the springtime the procession is often over 2,000 miles in length and about 100 miles wide.

Off the coast of Newfoundland, the ice flow is split by a slow ocean eddy formed by the junction of the southward current and the Gulf Stream. It is there that the bergs begin to wander aimlessly and drift into the shipping lanes of the North Atlantic. When this happens the International Ice Patrol comes to the rescue and warns all shipping.

Once the bergs enter the warm water of the Gulf Stream their further life is usually limited to about two weeks. Those that owing to their size do not melt become very unstable towards the end of Spring owing to the action of sea and Sun, and frequently large pieces weighing many tons break off. Considerable danger is encountered by Coast Guard cutters when a massive iceberg turns over, as the waves set up would sink any cutter that happened to be near.

Many methods of destroying icebergs have been tried by the Ice Patrol. Some years ago the "*Tampa*" set out to blow up a berg only 50 ft. out of water. Over 200 lb. of T.N.T. were placed in its side and exploded, but the result was disappointing—the berg still drifted along almost intact. The next victim was an iceberg showing 150 ft. above the water line. This time the sides were honeycombed with explosives, but all that happened was just a blackening of its side.

So the idea of blowing an iceberg to bits was abandoned and experiments were began to find something more effective. The latest method of destruction is the use of thermite. This is a mixture of aluminium and iron oxide that on ignition becomes incandescent, the temperature to which it rises being estimated to be in the region of 5,500 deg. F. Although the use of thermite is still in its experimental stage, it has destroyed bergs 500 ft. long and 100 ft. wide in only 12 hours.

Plastics in Everyday Life—(*Continued from page 402*)

woodflour, and the type of cotton used is chosen with that end in view. Thus, where only a moderate increase is required, pulverised cotton is used; while for the maximum strength-values, chopped cord or cotton duck pieces are used. For intermediate values, mixtures of various fillers may be employed.

From the earliest days of the industry asbestos has been extensively used as a filling medium, particularly where heat-resistance and resistance to moisture, together with dimensional stability under those conditions, are required. Asbestos is used either in powdered or fibrous form. When used as a powder or in very short fibres, it permits the production of mouldings with a high degree of finish and resistance to water and mild acids; but the resulting impact-strength values are low in comparison with those obtained with cellulosic fillers. The use of longer fibres enables the impact-strength characteristics to be considerably improved, but the finish of the mouldings is then not as good. The specific gravity of asbestos-filled materials is up to 50 per cent. greater than that of cellulose-filled materials, and the electrical resistance of mouldings produced from them is poor as compared with that of their cellulose-filled counterparts.

As a filling-material mica is in greatest demand where the best electrical insulating properties are required. Before being incorporated into a moulding powder it must be ground into fine flake form, preferably finer than 80 mesh, if the final moulding's finish and strength are to be as good as possible. Even so, in common with asbestos, it tends to produce materials of poor impact-strength, although mouldings produced from mica-filled powders possess good dimensional-stability and an exceptionally high degree of resistance to moisture.

In our next article the processes and machinery used for the moulding of the resinous and powdered plastics into their final shapes will be discussed.

Bats, Glombs and Gorgons—(*Continued from page 412*)

streamlined. The "Gorgon" in particular looked like a sleek winged white shark, and this 16 ft. long missile could hurtle through the air at 550 m.p.h. towards its target, guided by an operator with a television screen, on which he could tell the "Gorgon's" exact position relative to the target by means of an "eye" in the missile's nose. The "Gargoyle" was similar in purpose and operation, but was even faster, carrying its 1,000 lb. charge of explosive to the target at over 600 m.p.h.

Finally, the "Glomb" or Glider-bomb was more or less an ordinary light plane, guided by the same television "eye" but without any engines. It could nevertheless fly at 300 m.p.h., which would give enemy ships little chance to dodge it once it was on its way down.

Those were the most terrifying and accurate weapons the world had ever seen in July 1945. Then came the atomic bomb and overnight they were all obsolete. But scientists are now working on a combination of the two ideas—a television-controlled, rocket-propelled missile with an atomic warhead. We can only hope that U.N.O. will be so successful that these new and even more terrible weapons will remain just ideas.

Ship Repair and Salvage—(*Continued from page 416*)

descended in a metal bell and telephoned to the surface stating where the grips had to be landed, and they also helped with mechanical arms.

The use of compressed air has been of enormous assistance to salvage engineers in recent years. It is used in cases where the vessel is resting on the damage, or where the diver cannot get at the damage, or where the damage is too extensive. A large volume of air is delivered at a fairly low pressure, generally not more than eight or nine pounds to the square inch, so that the water in the fractured compartment is lowered, and this in itself restores buoyancy.

NATIONAL MODEL AIRCRAFT BUILDING CONTEST

"*M.M.*" readers who are model aeroplane constructors will be interested to hear that in connection with Britain's Third National Model Aircraft Exhibition, to be held at Dorland Hall during the Christmas Holidays, "*The Aeromodeller*" is offering over £150 in cash prizes and Silver Trophies for the best built model constructed from the specially designed "Dorland" plan. This model is a semi-scale duration model, and plans of it, together with fully illustrated building instructions and free entry form can be obtained from Aeromodeller Plans Service Ltd., Allen House, Newarke Street, Leicester; price 3/- post free.

The competition is in Senior and Junior sections for entrants above or below 16 years of age on 31st December 1946. To facilitate judging the country has been divided into 12 areas, with an area prize-winner in each, the finalists to be exhibited at the Dorland Hall Exhibition, where the National winner and runners-up will be selected. Each area has a £2/10/- prize for Junior and Senior classes, while the National winner in each class will be awarded £20 in cash and a Silver Trophy value £20, and there will be £10 Second and £5 Third Prizes in both classes.

Fireside Fun

"That mouth organ you gave me is the best present I ever had, mother."

"I'm glad you like it so much."

"Yes, it's jolly useful. Father gives me a shilling a week not to play it at home."

* * * *

Two snails were crawling over an old newspaper. One of them suddenly set off at a pace that alarmed the other.

"What's the idea?" asked the second snail. "Well-bred snails don't rush about like that."

"Can't you read?" asked the other. "I've just reached a coupon and it says 'Tear along the dotted line!' "

* * * *

"There was a horse that could count at the circus I went to last night. Wonderful, isn't it?"

"Oh, I don't know. A spelling bee is really more remarkable."

* * * *

"If a bamboo is a cane, what should there be in pickle for a bamboozler?"

"Oh, I don't know. What do you think?"

"Why, a rod, of course."

* * * *

"That child looks more than three to me."

"I know he does; he's had a lot of trouble."

* * * *

"Don't stop me. I have an appointment with a man to whom I owe £5."

"And you are anxious to get it paid? That's fine. Where are you to meet him?"

"Right here. I must be off."

* * * *

"My father and Callaghan fought for 20 years, but now they've stopped."

"Oh, they've buried the hatchet, have they?"

"No, they buried Callaghan."

* * * *

Teacher: "What are your boots made of?"

Billy: "Leather, sir."

Teacher: "What does leather come from?"

Billy: "Hide, sir."

Teacher: "What animal therefore gives you boots and also produces food for you?"

Billy: "Father, sir."

* * * *

THIS MONTH'S HOWLER

The Kalahari is a way of committing suicide that the Japanese use.

"Are there any sharks around these parts?"

"No sah! Dey'se 'fraid of de crocodiles."

* * * *

BRAIN TEASERS

WHO IS THIS?

Can you fill in the spaces in the diagram below with 7-letter words that satisfy the following clues? 1, Child in a foreign language; 2 Like a friar; 3, Rack for casks; 4, A small rope; 5, An animal; 6, More outspoken; 7, Reproached humorously; 8, Sportive; 9, Of the fifth degree; 10, A sprinkler.

If you do this correctly the middle column will reveal the name of a famous author of boys' stories.

1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

K.B.

* * * *

ANSWER THIS IN FIVE SECONDS

Here is a puzzle that should be solved after thinking for only a moment or two, but some readers may be a little bewildered before they see their way through it.

A man has a certain number of balls. Of these all but two are black, all but two are red, and all but two are green. How many of each colour has he got?

* * * *

SOLUTIONS TO LAST MONTH'S PUZZLES

The words in the double rectangle that formed our first puzzle of last month were BARONET, CORNETS, GENETIC, ONETIME, and NETTLED in the left-hand rectangle and TENSION, STENCIL, ATTENDS, CONTENT and SHORTEN in the right-hand rectangle.

The names of the countries jumbled in our second puzzle were Czechoslovakia, Yugoslavia, Portugal, Lithuania, Estonia, Switzerland, Albania, Bulgaria, Rumania and Latvia.

"Mars ARE MARVELLOUS"

They certainly are! Just chunks of sheer delicious goodness made with chocolate to sustain, glucose to energise, milk to nourish.

3d.

MARS CONFECTIONS LTD., SLOUGH, BUCKS.

WILSON

LEADERS AND PIONEERS
SCALE MODEL LORRY KITS

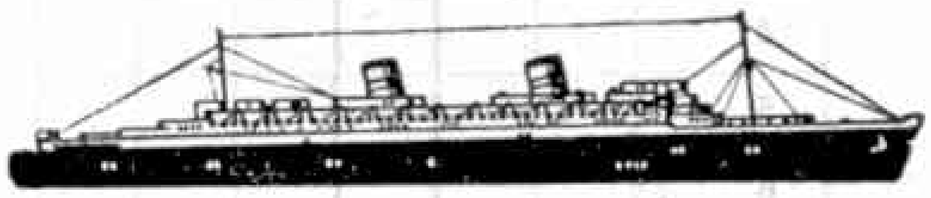
THERE IS NO COMPARISON

This is the new V/8 Lorry, a 15-ton rigid chassis, eight-wheeler van. The kit includes fully shaped wooden body and other de-luxe features including petrol tank, tool-box and twin rear wheels. Kit Price, 5/6, Purchase tax 1/3, Total cost 6/9

Send for the big Wilson catalogue which gives details of 17 kits and a host of building accessories price 1/- (Postal Order)

WILSON'S LORRIES LIMITED. Dept. M.,
1, GREAT WINCHESTER STREET
LONDON E.C.2.

MODELCRAFT'S
KIT OF THE MONTH



Queen Elizabeth

This kit is issued with the approval of the Cunard White Star Company who have co-operated in its preparation. The scale is 100 ft. to the inch to fit in with a fleet made to our famous 'Maritime 100' series of plans.

2/9 POST FREE

Modelcraft's AUGUST 1946

Magazine and List

Coloured card cover, 30 pages of articles, news items and notes. Over 300 plans, planbooks, etc., listed. Write for your copy to-day.

6d. POST FREE

Modelcraft Ltd.

77 (MM), Grosvenor Road, London S.W.1

BOND'S
TRACK PARTS
FOR
GAUGE "OO" and GAUGE "O"

With these parts you can build up your own model track which will be exactly the same as the real railway tracks

GAUGE "OO"

Steel Rail	2/6 doz. yds.
Brass Rail	3/6 doz. yds.
Chairs	2/- 100
Fishplates	4½d. doz.
Sleepers	1/- 100
Pins	6d. pkt.

GAUGE "O"

Steel Rail	2/9 doz. yds.
Brass Rail	7/- doz. yds.
Chairs	2/- 100
Electric Raised Chair	3/- 100
Fishplates	6d. doz.
Sleepers	3/6 100
Pins	9d. pkt.

Plus Packing and Postage

BOND'S O' EUSTON ROAD LTD.
357, EUSTON ROAD, LONDON N.W.1
Est. 1887 'Phone: EUSton 5441-2

SPRING! SUMMER! AUTUMN! WINTER!

All the year round, the model-making enthusiast finds time for his hobby. Others turn again to this interesting recreation as the evenings lengthen. Why not build a detailed scale model of a warship as your next effort!

F.R.O.G. PENGUIN 'JAVELIN' AND 'TRIBAL' CLASS

Destroyers have a correctly-shaped hull and perfect plastic guns and fittings. Construction becomes little more than careful assembly from these kits. 12/6 each, plus 5d. packing and postage on one, and 2d. extra for each additional kit.

Other outstanding F.R.O.G. productions shortly to be released are:

1·75 c.c. Aero Engine, complete with coil and condenser, £3-15-0 each, plus 1/- packing and postage. REVMASTER 4-6v. Electric Motor, 10/6 each, plus 4d. packing and postage.

Hamleys
Estd 1760
HAMLEY BROTHERS LTD

200-202, REGENT ST., LONDON W.1
(Our only address). *Tel.: Regent 3161*

Please send 2½d. in stamps for list of Aeroplane and Warship Kits.

'Plasticine'

The 'Real thing' in modelling materials is made solely by

HARBUTT'S

BEWARE OF SUBSTITUTES.
None other is genuine 'Plasticine'

STUDENTS' MICROSCOPE No. 3

Height 7½ in. Rack and pinion adjustment. Fitted plane silvered mirror. Magnification x 100. In fitted polished wood case, with lock, key, accessories and instruction book.

POSSESSION of this finely-made Microscope or any of the precision-made bench-tested models by Signalling Equipment Ltd. is a pleasure well worth waiting for. Although the supply is limited you may be fortunate enough to see one at your dealer's.

Other S.E.L. Products

Morse Practice Keys and Buzzers —Induction Coils—4 and 6v. Transformers — 4/6v. Electric Motors — Telescopes — Model Steam Engines — Electrical Outfits — Model Dynamos — 4/6v. Electric Bells — Pocket Compasses — Etc.

SIGNALLING EQUIPMENT LTD.

Merit House, Southgate Rd., Potters Bar, Mddx.

Phone: Potters Bar 2262/3 *Telegrams:* SEL, Potters Bar

Sharps SPECIALISE IN MAKING **TOFFEE**

EDWARD SHARP & SONS LTD
MAIDSTONE, KENT
THE TOFFEE SPECIALISTS

Bananas on the Brain!

You'd go a long way before you saw a head-load of bananas, but in Nigeria they've lots of them ... and plenty of Hercules cycles too. All over the world, just as at home, Hercules is the finest bicycle built to-day.

Hercules

The Finest Bicycle Built To-day

THE HERCULES CYCLE & MOTOR CO. LTD., ASTON, BIRMINGHAM

HJ10K

Have you tried AZOL?
It's a fine developer for Roll Films

Azol is a one-solution developer. It is very easy to use. All you have to do is to add water. A quarter of an ounce of Azol and six ounces of water will develop two eight-exposure 2¼ x 3¼ films. You can buy Azol from any good Photographic Dealer in 3-oz. bottles. It is much more interesting to do your own developing and printing. You miss half the fun of photography if you let someone else do it.

AZOL

is the developer to use.
It brings out the detail.

TO ALL AMATEUR PHOTOGRAPHERS
Send 3d. in stamps and we will post you a copy of the new 38-page book called HOME PHOTOGRAPHY. We will also enclose a set of the Azol time and temperature tables and an illustrated catalogue of our chemicals.

JOHNSON & SONS Manufacturing Chemists LTD., HENDON, N.W.4
Established 1743

Join the Well-Paid Ranks of I.C.S.-TRAINED MEN

MANY THOUSANDS MORE ARE URGENTLY NEEDED. PREPARE YOURSELF FOR A BETTER POSITION AND BETTER PAY

Ambitious men everywhere have succeeded through I.C.S. Home-Study Courses. So also can you. We offer you the benefit of our 55 years' matchless experience as the creative pioneers of postal instruction.

55 YEARS OF SERVICE

If you need technical training, our advice on any matter concerning your work and your career is yours for the asking—free and without obligation. Let us send you full information regarding the subject in which you are specially interested. DON'T DELAY. Make ACTION your watchword.

The successful man DOES to-day what the failure INTENDS doing to-morrow. Write to us TO-DAY.

The I.C.S. offer Courses of Instruction in a wide range of subjects, including:

Accountancy	Joinery
Advertising	Journalism
Aeronautical Engineering	Machine Designing
Aircraft Eng. Licence	Machine-Tool Work
Aero Fitting and Rigging	Marine Engineering
Aeroplane Designing	Mechanical Drawing
Air-Conditioning	Mechanical Engineering
Architecture	Mine Electrician
Architectural Drawing	Mine Surveying
Boilermaking	Mining Electrical
Book-keeping	Motor Engineering
Building Construction	Motor Mechanic
Building Specifications	Motor Vehicle Elec.
Business Training	Plastics
Business Management	Power-House Attendants
Carpentry	Quantity Surveying
Chemical Engineering	Radio Engineering
Chemistry, Org. & Inorg.	Radio Service Eng.
Civil Engineering	R'way Equip. & Running
Clerk of Works	Refrigeration
Colliery Examiners	Salesmanship
Commercial Art	Sanitary Engineering
Concrete Engineering	Sheet-Metal Work
Cotton Manufacturing	Short-Story Writing
Diesel Engineering	Steam Engineering
Draughtsmanship (State which branch)	Structural Steelwork
Drawing Office Practice	Surveying (State which branch)
Electrical Engineering	Telegraph Engineering
Engineer in Charge	Telephone Engineering
Eng. Shop Practice	Textile Designing
Fire Engineering	Toolmaking
Fuel Technology	Welding, Gas & Elec.
Garage Management	Woodworking Drawing
Gas-Power Engineering	Woollen Manufacturing
Heating and Ventilation	Works Engineering
Hydraulic Engineering	Works Management

And most of the Technical, Professional and Matriculation Exams.

YOU MAY USE THIS COUPON

(Penny stamp on unsealed envelope)

INTERNATIONAL CORRESPONDENCE SCHOOLS LTD.

Dept. 218, International Buildings, Kingsway, London W.C.2

Please send me the Syllabus of your Courses in .....

Name ..... Age .....

Address .....

.....

I.C.S.

BRITISH MADE **ASTRA** TOYS OF QUALITY

LIMITED SUPPLIES NOW AVAILABLE

"CARDBOARD ROLLING STOCK AND HOW TO BUILD IT"

The ideal book for expert or beginner!

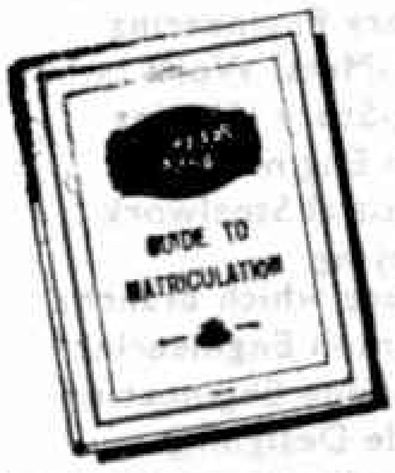
2/6 from leading model shops or 2/9 post free direct. For big list of parts, etc., send 6d. extra and large 1d. stamped addressed envelope marked "ISL/2" in top left corner.

PROJECT X!

A great new scheme which will delight every railway lover, young or old; send further penny-stamped addressed envelope for full details WHEN READY; mark "X" in top left corner and expect considerable delay.

E. RANKINE GRAY, Miniature Railway Specialist
691, CHRISTCHURCH ROAD, BOSCOMBE, HANTS.
Model Shops! Send for trade list.

STUDY AT HOME FOR MATRICULATION



Wolsey Hall (Est. 1894) will coach you **by post** for London Matric., School Cert., Engin. Prelim., Lond. B.Sc. Degree, Teacher's exams., etc. Tuition continued **free** if you fail; low fees, instalments, **PROSPECTUS FREE** from Director of Studies, Dept. GK1,

WOLSEY HALL, OXFORD

"CELONCITE" MODEL COLLECTIONS

Full-bodied metal models, finely coloured. FARM STOCK, grand array, 120 models, £3. ZOO, 85, £3. ARMY, 90, £3. (Larger, 184, £6). REDSKINS, Braves and Chiefs, 60, £2/5/–. Naval Personnel, 60, 42/–.
J. BAGULEY, Pensilva, Nr. LISKEARD, CORNWALL

MAIL ORDER DEPT. A.B.C. LOCOMOTIVE SERIES **33, Knollys Road, STREATHAM, S.W.16**

	Post free
Trains Illustrated (No. 3)	each 1/2
Locomotive Engineers of L.N.E.R.	,, 3/3
Locomotive Engineers of G.W.R., *by Ben Webb*	,, 1/8½
Engines of War, *by Guy N. Wildish* ..	,, 1/8½
L.B.& S.C. Locomotives, *by F. Burtt* ..	,, 3/9
Titled Trains of Great Britain, *by Cecil J. Allen*	,, 6/6
Romney, Hythe & Dymchurch Rly. Guide ..	,, 7d.
Veterans of the Track	,, 1/11½
Locollection	,, 1/2½
War on the Line (fully bound)	,, 8/–
A.B.C. of L.M.S. or L.N.E.R. (re-numbered)	,, 2/2½
A.B.C. of Southern Locos. and Electrics ..	,, 2/2½
A.B.C. of Southern or G.W.R.	,, 1/8½
Titans of the Track, L.M.S. (No. 2)	,, 2/2½
Titans of the Track, S.R.	1/8½

THE WORLD'S GREATEST BOOKSHOP

FOYLES
FOR BOOKS

New and second-hand Books on every subject. Stock of 3 million volumes.
119–125, Charing Cross Rd., London W.C.2
Gerrard 5660 (16 lines) Open 9—6 (inc. Sat.)

TELEPHONES
FOR HOUSE AND OFFICE

Constructors' Parts for your own Set up!

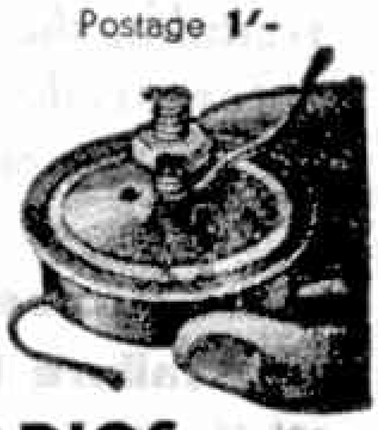
WALL TELEPHONE SETS.

Bracket Mike, vertical or horizontal	10/-
Transformer and Condenser for same.. ..	5/-
Magneto Bell fitted	5/-
Switch Hook and Contacts	2/6
Walnut Cabinet 8" X 6" X 3" fitted terminals and connections	5/6
Two L.R. watch pattern Earphones	10/-
Hand Magneto Ringer	12/6

SET AS ABOVE **30/-** TWO SETS **50/-**

G.P.O. Candlestick Microphone, carbon inset with switchhook for receiver, 5 ft. cord .. **7/6**
Postage **1/-**

G.P.O. Microphone Buttons.
1" brass body filled carbon granules thin mica diaphragm, **3/6** post free. 2½" metal diaphragm with centre hole, **9d.** Battery **7d.** Microphone Transformer and condenser, **5/–.** Leaflet of instruction supplied with each unit.



ELECTRADIX RADIOS
214, Queenstown Road, London S.W.8
Telephone: Macaulay 2159

RAPID WRITING for busy people. Send 3d. for first lesson. Double Speed Longhand (S11). 92, Great Russell Street, W.C.1

35 mm. Films. All descriptions from 6/–. Baers, 176, Wardour St., London W.1. Hire Programmes 10/–.

CHRISTMAS SHOPPING

Be sure to visit the MODELCRAFT SHOP for the best selection of Christmas Gifts. The best selection of Toys in North London.

GEORGE D. CAMPBELL
Dealers in Meccano
91, GOLDERS GREEN ROAD, LONDON N.W.11

STAMP ADVERTISEMENTS

(See also pages 430 and 432)

GRAND SURPRISE PACKET FREE!

MAP, SHIP, TRIANGULAR and WAR STAMPS, HINGES and PERFORATION GAUGE. The whole collection free only to those requesting our Famous DISCOUNT Approvals and enclosing 2½d. for postage.

SPECIAL OFFERS

100 Diff. Br. Colonials, Cat. 10/– .. 2/–
100 Diff. Whole World, Cat. 10/– .. 2/–
50 Diff. India 1/–; 10 Diff. Malaya 1/–;

Stamped Addressed Envelope Please

L. E. THOMPSON
70, CAVENDISH AVENUE, LONDON W.13

THE FIRST OF THE PEACE ISSUES FOR THE CROWN COLONIES

Cayman Is., 1½d.—3d.	6d.	Gambia: 1½d.—3d.	6d.
Fiji: 2½d.—3d. ..	6d.	Hong Kong: 30c.—$1,	2/–
Australia	11d.	N. Zealand	4/6
Burma	1/–	Niue	1/6
Cook Is.	1/6	Tangier	8d.
India	2/–	W. Samoa	1/6

Mint Items—All postage extra.
Burma: M.A. set to 8a, 3/6; 1p.—1r., 5/6; 1p.—2r. 9/6; 1p.—5r. 19/–; 1p.—10r. 37/–.
Malaya: B.M.A., 1c.—50c. (10) 4/–; $1 3/–; $2 6/–; $5 15/–.
Canada: 1942 Tank 13c. 3/–; Air Ex. 16c. 2/6.
See previous M.M. for offers of mint current B.C.'s, good stocks always available.

LETTS & CO., *Importers and Exporters* 65, St. Kilda Road, LONDON W.13

WILMSLOW MODEL AIRCRAFT CO.
WATER LANE, WILMSLOW, CHESHIRE

Personal attention means a lot to the model maker, especially when he orders by post.
We have the most varied and complete selection of model aircraft kits, solid, duration and gliding, in the country, together with every accessory. Plenty of motor rubber, dopes, props and building materials. The full range of ROYDON DIECASTS for solids in stock. Model Railway accessories "O" and "OO" gauges in stock. ERG card parts. No rubbish.
Send a 3d. stamp for our 8-page list of kits and accessories.

RADIO CONSTRUCTION

The finest results from the finest hobby—radio construction and operation—will be obtained by using
SPARKS' DATA SHEETS
which provide full constructional details, theoretical circuit, full-size detailed prints of drilling, assembly and wiring plans, and component list of noted
TESTED AND GUARANTEED DESIGNS

Here are a few of the many designs available in Data Sheet form. Send S.A.E. for full List "A."

BATTERY OPERATED. One-Valve Midget Portable M/L Waves, No. MP.1, 2/6; Three-Valve Ditto, Loudspeaker results, No. LO/S, 2/6; Two-Valve Midget, Med.-waves, powerful 'phone sigs., 9 V. H.T., No. LO/M, 2/6; Two-Valve Speaker Set, M/L Waves, No. LO/12, 2/6; Three-Valve "Straight" Set, good speaker sigs., Med.-waves, No. LO/3, 2/6; Three-Valve T.R.F. Set, M/L waves, No. LO/4, 2/6; Four-Valve Ditto, No. LO/8, 2/6; Short-wave Super Two, No. LO/2, 2/6; S. W. Three-Valver No. LO/7, 2/6

SPARKS' DATA SHEETS
9, Phœbeth Road, Brockley, London S.E.4

FREE—2/6 GREAT BRITAIN K.G. VI

This scarce high value stamp will be given free to all genuine applicants for our famous ONE PENNY APPROVAL BOOKLETS of BRITISH COLONIALS. These Booklets abound with JUBILEES, CORONATIONS, VICTORY, Bi-COLOURED PICTORIALS and the latest K.G. VI stamps. The best value on the market. N.B. Enclose 2½d. stamp for Postage.

S. FENLEY LTD., Winton, BOURNEMOUTH

MODERN APEX STAMP ALBUM
SPIRALLY BOUND—BEAUTIFULLY FINISHED
50 LEAVES 5/11

THONG BINDER
With 100 APEX No. 1100 LEAVES (Capacity 250) 35/–

SPRINGBACK STAMP ALBUM
With 50 APEX No. 1102 LEAVES (Capacity 100) 9/11

FREE GIFT WITH ALL ALBUMS

SPECIAL—PEACE ISSUES—AUSTRALIA 1/3; NEW ZEALAND 4/9; S. AFRICA AND DEPENDENCIES 13/6; INDIA 2/11; HYDERABAD 3d.; BURMA 1/2; NEW ZEALAND DEPENDENCIES 4/9; TANGIER 8d.; BAHAWALPUR (INDIAN STATE) 5/–; NEW ZEALAND 1943 HEALTH 1/3, 1944 1/3, 1945 9d.

Particulars of Approval and New Issue Service on Request for 1d. ALL ITEMS POST FREE

WILLIAM GOODE LIMITED
19, CLIFTON ROAD, RUGBY

25 Different AIR MAILS, 3/– post free; **30 WAR STAMPS,** 3/– post free; **SPECIAL BEGINNER'S PARCEL,** 250 Different Stamps, 8/– post free.
R. D. FURLONG, 1, Arundel Rd., EASTBOURNE, Sussex

BUILD & FLY A MODEL AIRCRAFT

Whether you require a "Duration," a "Glider" or a "Flying Scale" Model, you will find a good range of Kits from 2/– to 25/–, described in our latest List, price 3d. post free. Orders sent by return.

All Accessories Stocked
THE HOBBY SHOP
1729, LONDON ROAD, LEIGH-ON-SEA, ESSEX

FOR BUILDING ACCURATE RAILWAY AND SHIP MODELS, ALWAYS USE— "SKINLEY" BLUEPRINTS!

7th Edn. Railway Drawing Catalogue, Price 4d.
"Humber" Ship Drawing and Ship Kit Catalogue, Price 4d.
JOHN E. SKINLEY, M.J.Inst.E.
132, High Street, Southend-on-Sea, Essex

BOOKS:

Modern Loco. Classes	6/–
"Engines of War"	1/6
"Loco. Engineers of G.W.R."	1/6
"First Railway Across the Border"	2/6
"Modern Locos. and Electric Traction on S.R."	1/6

Postage extra.

ROLLING STOCK. Gauge 0. True Scale.
BLACK BAKELITE with DISC WHEELS

12 ton Mineral Wagons	12/6
12 ton Goods Van	15/6

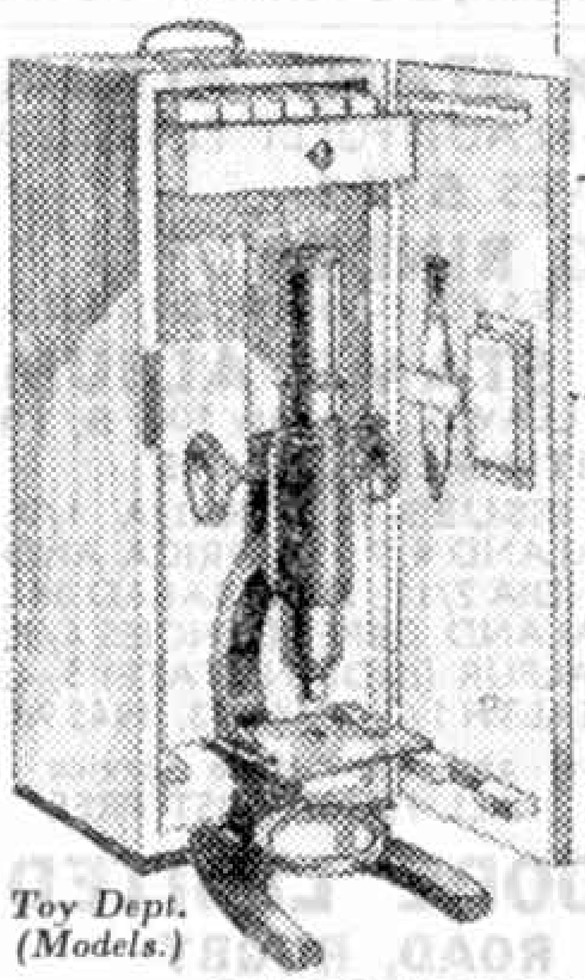
Postage 4d. extra.

TYLDESLEY & HOLBROOK (M.E.T.A.)
109, Deansgate, Manchester 3

A real scientific instrument that will give hours of enjoyment to Boys and Girls

COMPOUND MICROSCOPE

(Magnification of 100)



COMPLETE FOR **72/-**

Post and Pckg. 1/- extra

Enclosed in stained and polished wood case, with lock, key, carrying handle and book of instruction.

Specification:

(*a*) Detachable eyepiece and objective lens.

(*b*) Focal adjustment by rack and pinion.

(*c*) Mounting of curved limb and pivot screw design.

(*d*) Blank slides, cover slides and glass tubes are contained in separate drawer, also one pair of plated forceps.

Toy Dept. (Models.)

SELFRIDGES

SELFRIDGES LTD., OXFORD St., W.1. MAYfair 1234

Cigarette Card Collectors

1946 LIST NOW READY

Over 20,000 different cards priced in sets and odd cards.

Send 4d. for your copy now.

Current Bargain List, 1d.

Cards wanted. I purchase all kinds in perfect condition.

Send parcels for inspection and cash offer.

R. W. HOUSTON, BCM/EXCHANGE, LONDON W.C.1

"Duplicate Locomotives of the L. & S.W.R."

Illustrations, Building Dates, Classes, etc., 2/1 Post Free

Railway Hobbies Ltd., 86, Essex Road, Southsea, Hants.

CHEMISTRY ARE YOU INTERESTED?

Whether you dabble in experiments or pursue a course of serious study you will need our

LABORATORY EQUIPMENT.

Send 1d. stamped envelope for PRICE LIST.

BECK (Scientific Dept. G), 60, High Street STOKE NEWINGTON, LONDON N.16

Booklet, "Experiments in Chemistry," 7d. P.O.

★ **The REX PRICED CATALOGUE**

OF THE POSTAGE STAMPS OF KING GEORGE VI

JUST OUT: **3/3** p.pd., 350 illus., 108 pages

E. PAULSEN, B.P.A., P.T.S., J.P.S.,

67, Farm Road, EDGWARE, Middlesex, Eng.

MECCANO MAGAZINE

Registered at G.P.O., London, for transmission by Canadian Magazine Post.

EDITORIAL AND ADVERTISING OFFICES:
LIVERPOOL 13, ENGLAND.
Telegrams: "Meccano, Liverpool."

READERS' SALES AND WANTS

SALES

Hornby Gauge "0" Clockwork Railway, two engines, Coaches, Trucks, Points, Tracks and Accessories, £12.—Fry, 95, Hursley Road, Chandlersford, Hants.

New Album containing Stamps worth over £4/10/- for £2/10/- or nearest. Two Morse Tappers and Buzzer 8/-.—Cavanagh, 1, Ashbourne Street, Leeds 10.

Meccano No. 5; Dinky Toys; Gauge "0" and "00" Electric Equipment. S.A.E. for particulars to—J. C. Rawlinson, Knowle School House, Mirfield, Yorks.

Hornby Clockwork Train Set, 55 items, £20. Send stamp for particulars and photos.—Dolman, 34, The Ridgeway, London W.3.

110 copies "The Aeroplane," October—December 1943; January 1944—December 1945. Good condition. Offer to—I. R. Peterkin, 3, Broadstone Park, Inverness.

Stanley Gibbons Loose Leaf Stamp Album with over 750 good Foreign Stamps. What offers?—Morley, Cambria Farm, Bobbing, Sittingbourne.

79 "Flights" from 22nd April, 1943 to 27th December, 1945, 30/- or 6d. per copy; 46 "Aeroplanes" from 16th April, 1943 to 2nd June, 1944, 18/- or 6d. per copy; 9 "Aeronautics" from June, 1943 to June, 1944, 7/- or 1/- per copy. Prices include postage. All in excellent condition. Stamp for list.—R. Jennings, Homeleigh, Ware Road, Hoddesdon, Herts.

"World's Warships," 1915; "Jane's Fighting Ships," 1927 and 1929, Volumes 7 and 8. "The Scout" (Bound). What offers? Good condition. Stamp for details.—D. Brockies, 807, Sidcup Road, London S.E.9.

Size 6, Leather Spiked Running Shoes, excellent condition, 21/-; "Amateur Photographers," 1941, 41 copies 12/6: 1942, 49—15/-: 1943, 47—15/-: 1944, 34—12/6: 1945, 45—20/-.—Pethybridge, 10, Abbotsbury Road, Newton Abbot.

Marklin 20v. A.C. Three Coach Underground Unit; Internal Lighting; Runs on standard Hornby rails: Best offer over £4.—Walker, Breeze Hill, Littleborough, Lancs.

"William" Books, eight copies in perfect condition, 25/-.—Goddard, Kennetholme, Midgham, Reading.

WANTS

"M.M.'s" October, November, 1943; January, March, April, June, December, 1944. Good condition, 1/- each.—J. Curran, 23, Glenpark Avenue, Thornliebank, Glasgow.

Urgently wanted. "Meccano Magazines," any copies between 1933 and 1940, also before 1931, state price.—Seager, 65, Cambridge Grove, London W.6.

"Magnet," "Gem," and "School Boys' Own Library." Good condition, Any issues. State price. Write—McIndoe, 416, Hinckley Road, Leicester.

"Meccano Magazines" for December 1945 and January 1946. Must be in good condition. Reply—Johnson, 21, Cranborne Gardens, Upminster, Essex.

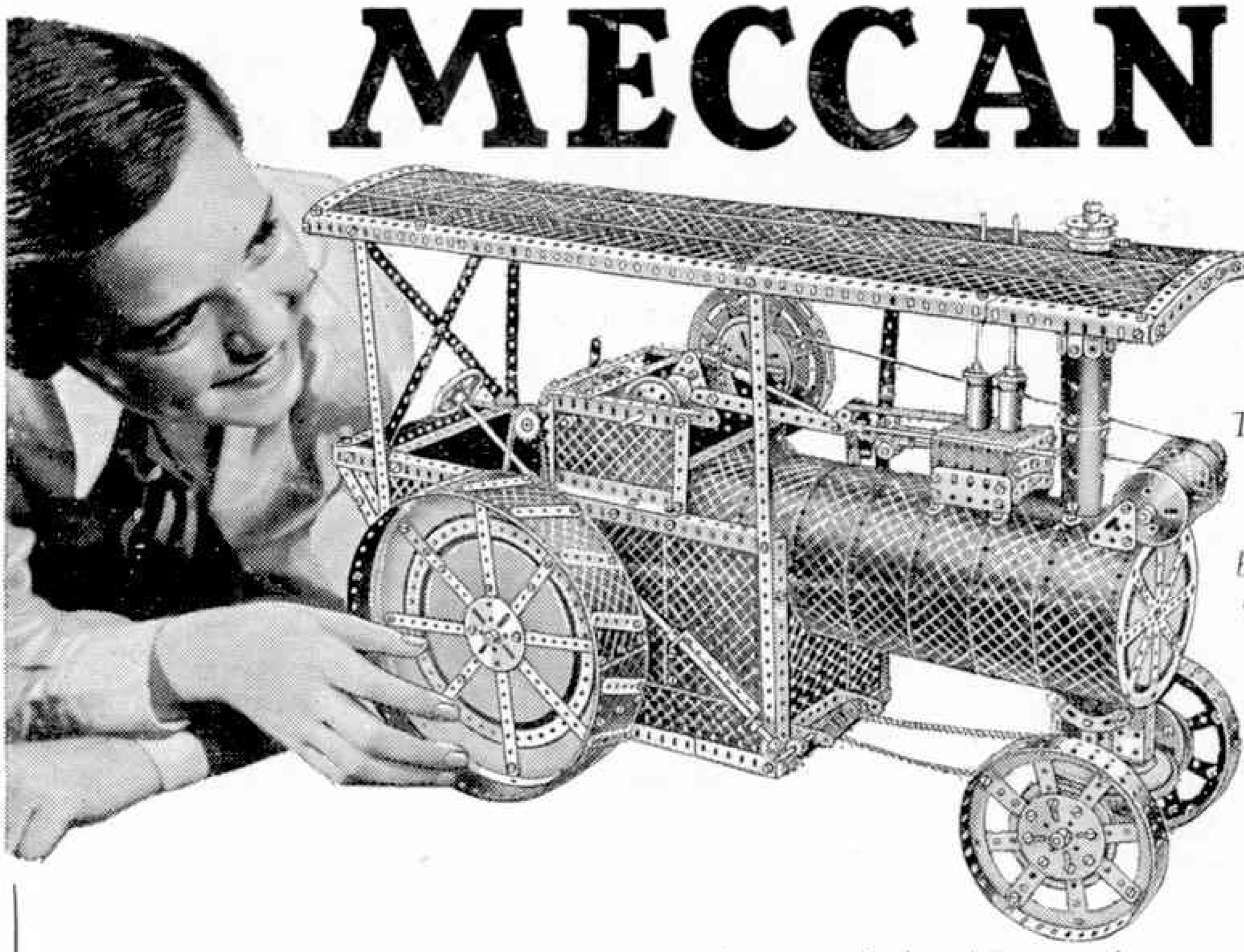
Good price given for "Peacock" postcards Lynton and Barnstaple Railway.—Dwelly, "Sunray," King's Road, Fleet, Hants.

Copies of the June 1946 "Meccano Magazine" urgently required, write—"M.M." Box M.10.

"M.M.s" October 1939 to February 1945 inclusive. Write in first instance to—G. Otzen, Nicholson Street, Orbost, Victoria, Australia.

"Meccano Magazines," January 1943—December 1945 (inclusive) and 1938-9. Also December 1930. In good condition. State Price.—"M.M." Box 9.

MECCANO



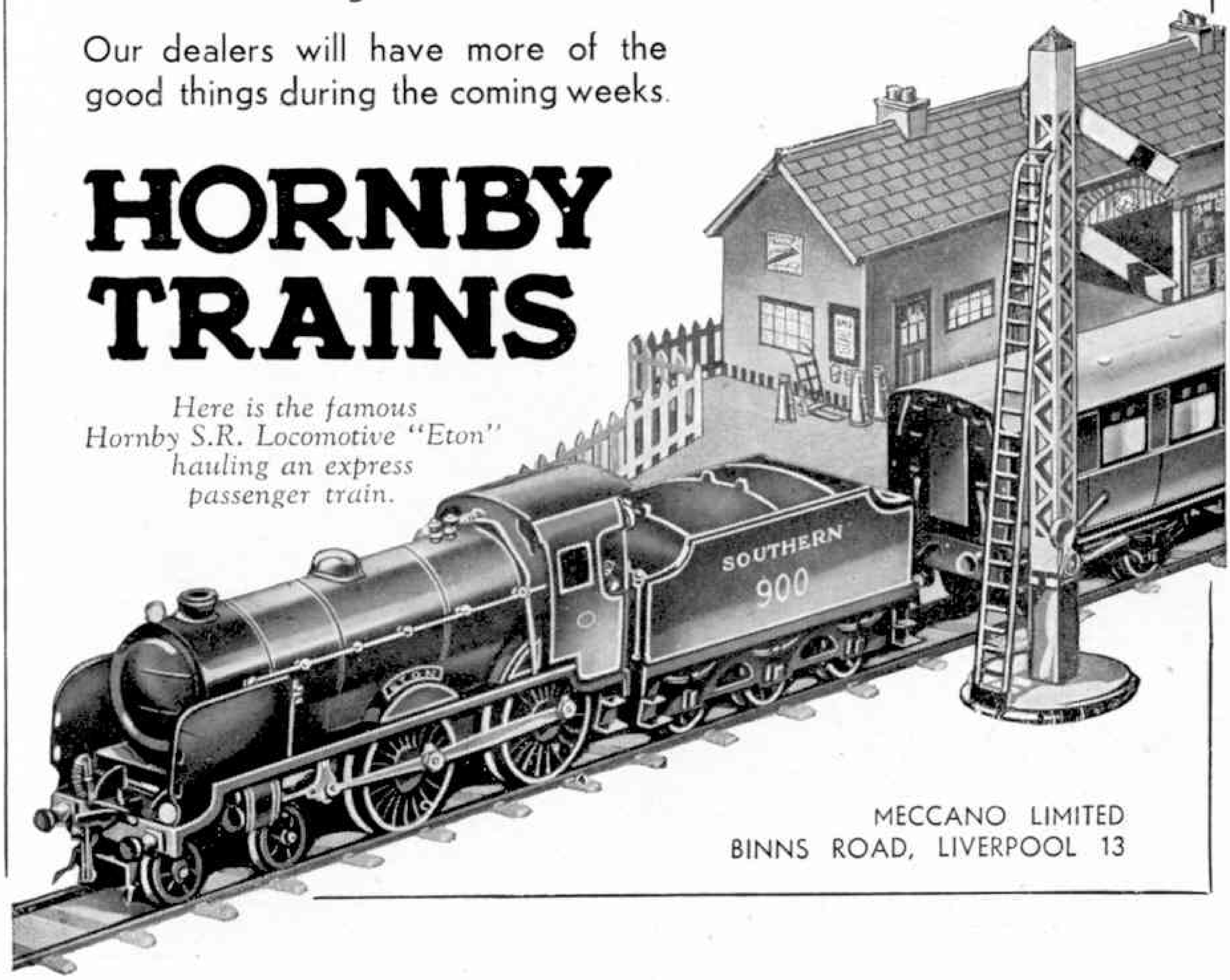
This splendid model of a Traction Engine is built entirely of standard Meccano parts.

Here are two pictures to remind you of the happy days you used to have before the war. It will not be long now before the good times are here again.

Our dealers will have more of the good things during the coming weeks.

HORNBY TRAINS

Here is the famous Hornby S.R. Locomotive "Eton" hauling an express passenger train.



MECCANO LIMITED
BINNS ROAD, LIVERPOOL 13

MECCANO
DINKY TOYS
HORNBY TRAINS
DUBLO TRAINS

If you are still waiting for your share of Meccano and Dinky Toys, you will be glad to know that your dealer will have more during the coming weeks.

Obtainable ONLY from Meccano dealers.

MECCANO LIMITED - BINNS ROAD - LIVERPOOL 13

PUBLISHED BY MECCANO LTD., BINNS ROAD, LIVERPOOL 13, ENGLAND.
Printed by John Waddington Ltd., Leeds and London.